

# ALASKA BEST MANAGEMENT PRACTICES for HARBOR, MARINA and BOAT OPERATIONS

Prepared for:

**State of Alaska**  
Office of the Governor  
Juneau, AK

Prepared June 30, 1995 by:

## **Neil Ross Consultants**

PO Box 56, Kingston, RI 02881  
*tel./fax 401-782-2116,*  
*email: neilross@aol.com*

- Neil W. Ross, Principal Investigator
- Mark Amaral
- Jared L. Rhodes

## **Concepts Unlimited**

PO Box 108, Kodiak, AK 99616  
*new tel. 505-866-5960, fax 505-866-5956,*  
*email: loishansen@aol.com*

- Lois Hansen
- George V. 'Corky' McCorkle

*Updated June 2004 by the staff of:*

## **The Alaska Coastal Management Program**

- **Department of Natural Resources**  
*Office of Project Management and Permitting*
- **Department of Community and Economic Development**  
*Division of Community Advocacy*

## EXECUTIVE SUMMARY

Each harbor, marina, boatyard and vessel in Alaska creates some incremental pollution and waste, which can ultimately enter the state's clean and productive coastal waters. While each contribution is almost insignificant, when added to many other bits, harbor pollution can add up to cause worry about water quality. Even very small volumes can result in limited but very real harm. Alaskan boaters and harbormasters must not, and cannot ignore it.

Fortunately this type of incremental harbor pollution is very easy to prevent and clean up; and not necessarily expensive to do. Failure to control and clean up pollution can bring costly fines.

This project is part of Alaska's move to control and cleanup harbor pollution before it becomes a gross problem. A five member cross continental consulting team, including two Alaskans, received a contract to locate, review, and select good examples of best management practices (BMP) published throughout the nation.

The selection process included reviews of draft BMP lists by government representatives of federal and Alaska environmental regulatory agencies, plus six harbormasters, a private marina manager, and a University of Alaska Sea Grant marine advisory specialist.

The BMPs selected are organized into six tables:

- polluted runoff,
- solid waste,
- liquid materials,
- petroleum leaks & spills,
- boat sewage,
- vessel cleaning, and
- boat operation management.

The tables contain a total of 259 BMP examples of different ways to manage harbor pollution. In each table, beside each example, are helpful comments about where the BMP will work, issues and notes to consider, cost ranges for both capital construction and annual operation/maintenance, and a source reference number.

This is Alaska's first look at BMPs for boats and harbors. The next step will be to use these examples as a spring board to evolve a practical, common sense management approach to help keep Alaskan harbors clean.

# TABLE OF CONTENTS

I. Introduction			
A. The Harbor Pollution Problem	1		
B. Common Sense Pollution Control Basics	2		
C. Best Management Practices (BMP)	2		
D. BMPs Work For Storm Water Permit Too	3		
E. Information Gleaned From Conversations With AK Harbormasters	3		
II. Project Approach			
A. How BMP References Were Found	5		
B. BMP Examples Selection	5		
III. Best Management Practices			
A. Using The BMP Examples Tables	6		
B. BMP Example Tables			
<i>Table 1. Polluted Runoff</i>	8		
a. Potential problem			
b. Upland hull maintenance areas			
c. Other upland areas			
d. Raising awareness & education			
<i>Table 2. Solid Waste</i>	11		
a. Potential problem			
b. Vessel operation & marine debris			
c. Repair & maintenance in boatyard areas			
d. Tidal grid, drydock & in-water repair & maintenance			
e. Fish waste			
f. Raising awareness & education			
<i>Table 3. Liquid Materials</i>		16	
a. Potential problem			
b. Storage & disposal			
c. Handling			
d. Alternative materials			
e. Raising awareness & education			
<i>Table 4. Petroleum Leaks &amp; Spills</i>		20	
a. Potential problem			
b. Petroleum spills			
c. Fueling			
d. Bilge water			
e. Repair & maintenance			
f. Raising awareness & education			
<i>Table 5. Boat Sewage</i>		27	
a. Potential problem			
b. Disposal			
c. Pumpout system maintenance			
d. Raising awareness & education			
<i>Table 6. Vessel Cleaning</i>		30	
a. Potential problem			
b. Pressure washing			
c. In-the-water cleaning			
d. Raising awareness & education			
<i>Table 7. Boat Operation Management</i>		33	
a. Potential problem			
b. Boat operations in shallow water and nearshore areas			
c. Raising awareness & education			
IV. Appendices			
A. Annotated Reference List		35	
B. Alaska's Cross Continental Consulting Team		41	
C. Literature Search Process		42	
D. Alaska Marina & Harbor BMP Reviewers		43	

# I. INTRODUCTION

## A. The Harbor Pollution Problem

Each boatyard, marina, harbor and boat in Alaska create pollution and waste, including fishing line, plastic buckets, bottles, oily bilge water, minor fuel spills, untreated sewage, solvents and bottom paint chips. The pollution varies by season, type of boat, maintenance, and harbor usage. Recreational boats tend to contribute the most on weekends and holidays during the boating season and in places where they concentrate in marinas and favorite fishing sites. Commercial vessels have longer seasons and contribute more pollution per vessel due to intensity and frequency of use.

Marinas, boats and harbors generate relatively low volumes of pollution from several sources, scattered in and between widely separated harbors, spaced over many days and months. This is called *incremental contamination* —a little here and there, widely scattered over time and space.

Incremental impacts result from the innocent everyday activities of boaters, like you and me, which eventually can

result in polluted water, degraded fish habitat, and ugliness. Pollution which enters the waterway this way is called *nonpoint source pollution* (NPS).

Most harbor contamination enters the waters directly, with some coming from a pipe, storm drain, culvert, or low area which drains a vessel maintenance area or boat repair yard. Usually this arrives in runoff as a result of rain or snow melt—this is called *storm water pollution*.

Many marina and boatyard activities result in solid and liquid wastes. Solids wastes include: collected trash from customers and staff; dry bottom sandings; power washing fouling piles; hull scrapings at tidal grids; scraps of fiberglass, wood and metals from boat and dock maintenance; shipment packaging; and plastic debris. Liquid wastes flow from painting, hull cleaning, fueling, oil and antifreeze changing, petroleum leaks/spills, boat sewage and fish waste.

Discarding solid and liquid wastes into the environment will eventually cause harm to the marina land and boating waters. Trash becomes unsightly litter that endangers marine life, and degrades the pleasure of boating. Other solids slowly release metals and toxic chemicals into the

water harming plants and animals. Liquid chemicals dumped into water quickly destroy aquatic life or on the ground pose potential harm to people and animals.

Every marina, boatyard, yacht club, boat, car, person and animal creates some waste products that can enter Alaska's harbor environment as a pollutant. Pollutants get from marina land and boats to surface waters by a variety of means, including rain runoff, snow melt, ground-water infiltration, washing by hose, leaks, pumping overboard, wind blown, and accidental or direct dumping by people. After the contamination enters the waters, it can do environmental harm and make boating unpleasant and unsafe.

Dirty harbor operations discourage use by recreational boaters and encourage further sloppy habits by commercial boats, and public, which all combine to reduce marina income potential. In extreme cases, this pollution can have economic impacts on tourism, recreational boating, and fishing industries. Marinas and boatyards need every advantage to make profits. A proactive clean marina approach does attract customers.

## B. Common Sense Pollution Control Basics

Fortunately this type of incremental harbor pollution from boating and marina activity is very easy to prevent and clean up; and not necessarily expensive. Failure to control and clean up pollution can bring costly fines.

The three basic methods of preventing and controlling environmental harm are: source control, delivery reduction, and clean up.

1. **Source control** is the first, often best and least costly opportunity to prevent contaminants from entering the air-ground-water. Control occurs at the site where the pollutants are created or used. Methods vary for different types of nonpoint source problems, e.g., stop use of a toxic solvent, reduce the volume its use through dilution, or switch to less harmful product.

2. **Delivery reduction**—catch, hold, treat, reduce—practices intercept contamination leaving the source by capturing, containing, filtering, and/or treating pollutants before they can get into the water or ground-water resource. Often more expensive and

much less effective than source control, delivery reduction will filter, screen, trap, absorb, divert to municipal sewer line, or chemically neutralize.

3. **Clean up** begins after a spill and contamination has happened. This reactive approach generally occurs after an accident or major storm and is the most costly to do, harmful to the environment, and may be subject to heavy fines.

## C. Best Management Practices (BMP)

Best Management Practices are defined as all methods and manners which help control or prevent the addition of pollutants into the environment. BMPs can widely range from pollution control designs constructed in new or expanding marinas, to posting simple signs which tell boaters what is expected.

In general, the BMPs selected in this project should work in most harbors in Alaska. They will need to be further adapted to Alaska through a public review process.

- BMPs can become regulations for strict adoption, or more common as

guidelines to select from.

- BMPs are examples of the kind of practices which boat owners, facility managers, and harbor masters can use to reduce pollution loading into the water.

- Since each site is different, unique BMP combinations will probably be adopted in Alaska's harbors to do the job as needed. In sites where a particular problem does not exist, then BMPs need not be adopted for that issue.

- These BMPs should work under both the coastal nonpoint pollution control and the storm water permit programs. In addition, Alaska's harbors generally comply with the MARPOL environmental regulations for all facilities.

- Every harbor and marina should develop its own written pollution prevention plan which lists the BMPs chosen for the site. The PPP will help assure that all staff, outside boat repairers, and boat operators know what is expected.

Pollution from all sources is a concern which is being addressed in every Alaska harbor. Currently,

Alaskans are working to build upon existing management policies and practices to minimize the effects of nonpoint sources of pollution. Alaska's 6217 NPS program is called the "Coastal Clean Water Plan".

This document compiles the best coastal BMPs from around the country for use in Alaska. It provides a starting point for marina operators, harbor-masters, and the State to begin selecting practices which can easily and cost effectively keep our waters clean. Many of the BMPs can also help comply with the MARPOL regulations already in force in Alaska.

Pick the best BMPs, from the examples in this document, which will work in your harbor or facility. Modify the wording to keep the general idea while adapting to the site's unique mix of uses and situation. Any plan is only good when used as a guide and educational tool for all harbor and marina employees and users.

## **D. BMPs Work for Storm Water Permit Too**

Each of the BMPs in this report, if used appropriately, will help reduce or prevent the addition of pollution to Alaska's waters.

- All of the BMPs in this report's tables do comply with Federal nonpoint source (NPS) guidelines. They can be listed for use in any marina or harbor's pollution prevention and control planning.

- With very few exceptions, almost all of the BMPs also will help marinas and harbors comply with USEPA NPDES Storm Water Program requirements for a Storm Water Pollution Prevention Plan (SWPPP). A Storm Water Pollution Prevention Plan is needed for boat maintenance and repair areas in a marina, boatyard or harbor.

Alaskans seeing more information on the NPDES program in Alaska, can contact Pete McGee, AK Department of Environmental Conservation, tel. 907-451-2101, or Joe Wallace, USEPA Region 10, Seattle, WA, tel. 800-424-4372, extension 8399.

## **E. Information Gleaned From Conversations With AK Harbormasters**

1. The BMPs are good information for ALL harbors. However, the larger harbors like Juneau, Seward and Homer that deal with large recreational fleets will in the long term need to implement most, if not all, the BMP examples in this report.

2. Small harbors, which include most of the state harbors, should implement just the BMPs that are appropriate for each individual harbor/marina.

3. To implement the BMPs in Alaska, in most cases, may require several years. This will depend on the support of advisory boards, city managers, and city councils for funding. It is also important to work through the (AAHPA) Alaska harbormasters. The users will need time to adjust to the BMP regulations and education will be needed over a period of time. Their cooperation will be very important to reach the goals to comply with these regulatory environmental laws.

4. Users—vessel owners/operators—of public and private facilities will need to follow the policy and harbor

ordinances as adopted by the harbormasters. If maintenance and repair work is to continue in the harbors, wet slips, and upland areas, harbor codes or policies must be amended to meet the BMP to prevent and control additional pollution sources.

*NOTE:* These BMPs will also affect commercial vessel activities by setting the ground rules for using harbor facilities. Most harbors already have MARPOL and grid iron policy in effect. The recreation BMPs will only strengthen this effort for the harbors and assist in educating the Alaska public.

Keeping in mind that Alaska harbormasters never heard of BMPs until the Marina Environmental Workshop program in Nome in November 1994. The many different BMP examples are overwhelming and hard to get a handle on at first. However, the overall response of the harbormaster reviewers was that ALL the BMPs are good. The BMPs in the tables are excellent material. It is recommended that these BMPs be the center focus of the 1995 harbormaster conference in Haines. During round table discussions plans could be

constructed for short term and long term BMP selection and implementation.

Another fact of life is that Alaskan harbors are reducing budgets to bare bones operations, capital projects have been reduced. Funding will be a challenge at all levels. The state legislature is cutting state government to minimum levels and federal dollars are difficult to secure with the down sizing of government.

Educating the Alaskan public is going to be a major task. BMPs will have a financial as well as a regulatory effect on the vessels owner/operators and users of the harbor. This will be a problem that will burn the ears of harbormasters and local advisory boards, etc. The State needs to market BMPs, starting with news releases, harbor brochures, radio and TV talk shows, etc. Political leaders also need to be educated and their support is needed for funding and other assistance.

## II. PROJECT APPROACH

### A. How BMP References Were Found

The prime method used for compiling these Best Management Practices (BMPs) was to locate published Best Management Practices for marinas and small craft harbors. The consulting team members started with an on-hand collection of over fifty published reports, articles and manuals on BMPs for marinas. Additional references were identified through a computer search of national databases. Altogether nearly 200 references were identified as possible candidates for use.

*Please see Appendix C for details of the computer search process.*

### B. BMP Examples Selection

The BMPs contained in this document were selected from a wide range of potential practices in use throughout the United States. To narrow the number of BMPs in this manual to those that were most appropriate for Alaska we used several criteria.

### BMP Examples selected to address these goals:

1. Able to reduce the use of, prevent the discharge of, or treat one or more of the following:
  - a. Polluted runoff from upland hull maintenance areas;
  - b. Polluted runoff from marina uplands other than hull maintenance areas;
  - c. Solid waste produced by the cleaning, repair and maintenance of boats on tidal grids;
  - d. Solid waste produced by the operation, cleaning, maintenance and repair of boats in other areas of a harbor or marina;
  - e. Fish waste, except fish waste produced by seafood processors;
  - f. Liquid materials such as oil, solvent, antifreeze and paint;
  - g. Fuel spills and bilge pumping;
  - h. In-water and underwater boat cleaning;
  - i. Sewage disposal;
  - j. Improper maintenance of sewage facilities; and
  - k. Boat operations in shallow water and nearshore areas.

2. Published in reports, articles and manuals since 1985.

3. Consistent with the management measures outlined in EPA guidance for nonpoint pollution sources (NPS) and many covered by Alaska storm water permits (NPDES).

4. Appropriate for use in Alaska's harbors with its mix of recreational and commercial boats, small craft boating facilities (with 10 or more slips, moorings, berths) and their associated shore-based services that support and service recreational boats.

5. Effective in Alaska's range of harsh climate conditions, particularly for all weather capability and tolerance to freezing and thawing conditions.

### Draft Review

A preliminary review of the first draft BMP **examples** was held on June 8, 1995 by government officials through a telephone conference meeting with the consultants, including Alaska Departments of Transportation, Environmental Conservation, Fish and Game, Office of Governor, and the US Coast Guard. Appropriate recommended revisions were made by the consultants.



## Alaska Checkout

To assure appropriateness for Alaska, a 'ground truth' evaluation of the BMPs was done by a committee of eight Alaskan professionals (listed in Appendix C), including five harbormasters, one private marina manager, and one Sea Grant advisor, along with the project team. These reviewers were chosen for their knowledge of Alaska's harbors, knowledge of the EPA coastal nonpoint pollution control program guidelines, availability and willingness to help.

## Final Report

Using comments and suggestions from all reviewers, the final BMP examples in each of the six tables were compiled, reviewed, edited and completed in this document.

# III. BEST MANAGEMENT PRACTICE EXAMPLES

## A. Using the Best Management Practice Example Tables

Six tables are provided; one for each major pollution problem area identified by the State of Alaska—polluted runoff, solid waste, liquid materials, petroleum leaks and spills, boat sewage, vessel cleaning.

The tables are designed for a quick and simple review of best management practices compiled from twenty-five published reports and articles for recreational marinas, boatyards, and harbors. The examples were chosen because each shows a different approach or alternative method for dealing with boat and harbor pollution.

- **Title** - Each table title indicates key pollution issue for BMPs (e.g., Table 1. Polluted Runoff).

- **Potential Problem** - A descriptive statement of the environmental issue, what the pollutants are, why we are concerned, and how they can get into the water.

### *Table Columns*

- **Issue, Area, Approach**

Lower case letters (a, b, c ...) indicate different BMP sections or areas of concern which target harbor practice (e.g., maintenance), location (e.g., upland), or method (e.g., education)

- **BMP Examples**

Each example number (1, 2, 3 ...) is the actual wording of a Best Management Practice published for marinas to use; many are common sense. Actual wording to be adopted in Alaska can differ as appropriate.

- **Where/When Useful**

Some BMPs might be appropriate for use in most marinas and small boat harbors, while others have limited usage. General description of where and when the practice is likely to be useful. For example, a pumpout is useful where there are boats with holding tanks and there is a way to dispose of the sewage.

**• Issues for Alaska**

This column contains a range of comments from and for Alaskans, including where a practice may not work or be appropriate, when programs need to be developed (e.g., education), or conditions which may be missing but should be considered (e.g., requires staff time and commitment).

**• Estimated Costs in Alaska.**

BMP costs will vary from marina to marina, and harbor to harbor, due to site specific factors, including product availability, shipping, climate, geology, labor rate, type and number of recreational boats, available infrastructure. Consider these cost ranges as statewide averages.

**• Capital**

Estimated construction, purchase and/or installation cost ranges:

- Zero = \$0
- Low = under \$1,000
- Moderate = \$1,000 - 4,999
- High = \$5,000 - 9,999
- Expensive = \$10,000+

**• Operation/Maintenance**

Estimated annual cost ranges for operating the systems and keeping it running:

- Zero = \$0
- Low = under \$500
- Moderate = \$500 - 1,000
- High = \$1,000 - 4,999
- Expensive = \$5,000+

**• Reference**

Each BMP has a reference number to its source(s) and page on the original document listed in Appendix A. The publisher’s phone number is listed for those wishing to acquire copies of the original document (note: some reports are free while others are costly).

**• Notes**

Other useful information, cautions, tips, advice or comments thought useful when Alaska creates its own statewide BMP guidance for harbors and marinas.

**B. BMP Example Tables**

On following pages find:

Table 1. Polluted runoff

Table 2. Solid waste

Table 3. Liquid materials

Table 4. Petroleum leaks & spills

Table 5. Boat sewage

Table 6. Vessel cleaning

Table 7. Boat Operation Management

# Polluted Runoff

a. POTENTIAL PROBLEM: Rain, melting snow and rinse water running over land wash and dissolve a wide variety of pollutants - some seen, some unseen.

Runoff water moves downhill collecting more and more contaminants, ultimately flowing into a boating waterbody where it can hurt marine life.

For instance, sanding and painting boats is often a messy job with a great deal of dust, solvents, and paint falling onto the ground to later be carried into boating waters as runoff.

Antifouling paint is made with toxic chemicals which slowly leach out to minimize boat bottom growth.

Runoff tends to concentrate the amounts into the boat basin soil which can be harmful to the environment.

<b>b. Upland Hull Maintenance Areas</b>						
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Estimated Costs</b>		<b>Reference</b>	<b>Notes</b>
			<b>Capital</b>	<b>Ops/Maint</b>		
1. Provide and clearly mark designated work areas for outside boat repairs and maintenance. Do not permit work outside of these areas.	Good for daily operation cleaning & painting.	Not useful in areas without sufficient upland area.	high	high	#23, p.5-48	Designated areas should be equipped to control waste from boat maintenance.
2. Implement effective runoff control strategies, e.g., resurface areas with crushed gravel, decrease the slope of facility towards surface waters, or install filters, wet ponds, buffers and separators that remove 80% of the total suspended solids.	For preventing solids from reaching waters on a continuous basis.	Were runoff control is not possible or practical.	expensive	expensive	#2, p.21	Alaska needs to decide if 80% TSS removal is appropriate goal; impremeable surfaces could be considered instead of crushed stone.
3. Capture and filter pollutants out of runoff water with tarps, screens, and filter cloths.	Effective and economical to implement.	Where tarps, screens or filters will not be effective.	moderate	high	#20	
4. Cover storm drains located near the work area to prevent materials from reaching surface waters.	Locations with storm drains; effective if covered with screens or filters that allow water through.	Locations without storm drains; not effective in heavy rains which require drain fully open.	moderate	moderate	#6, p.V5	Useful while work in progress and no rain; but drain there for purpose.
5. Eliminate all bottom cleaning and sanding in or beside marina waters.	Locate bottom cleaning work to upland area away from water.	Harbors must have a designated area away from water to perform bottom jobs; requires boat hauling.	zero	zero	#20	Also applies to boat work on beaches
6. Perform maintenance work under cover.	Useful where land space allows building or shelters which keeps rain off work area.	Tarp covers don't work well in bad weather conditions; buildings can be expensive.	low	low	#2, p.21	Encourage private boat repair buildings & service.
7. Perform abrasive blasting and spray painting within buildings.	Useful where land space allows building or shelters which keeps rain off work area.	Tarp covers don't work well in bad weather conditions; buildings can be expensive.	high-expensive	high-expensive	#23, p.5-48	Encourage private boat repair buildings & service.
8. Prohibit uncontained blasting and spraying over open water.	Very good, effective when enforced.	Weak enforcement undermines effectiveness; in wet moorage areas.	moderate	low	#6, p.V48	
9. Dust and over-spray from abrasive blasting, sanding and painting should be controlled with drapes to minimize the spreading of wind blown materials.	Very good if material are collected on a regular basis.	Tarp covers don't work well in bad weather conditions.	moderate	moderate	#4, p.24	
10. Spent sandblasting grit and debris should be stored under cover and in a manner that minimizes contact with process or storm water.	Very good if material are collected on a regular basis.	When adequate storage containers are not used, near or on waterways.	moderate	low	#4, p.38	

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
11. Inspect and clean sediment traps regularly.	Effective when done regularly.	Requires commitment and staff time for inspections.	zero	low	#6, p.V48	
12. Use dustless sanders to remove paint from hulls.	Extremely effective on dry surfaces.	Requires dry surface.	moderate-high	moderate	#2, p.21	State of the art for boat maintenance now.
13. Perform maintenance over tarps to ease the cleanup process and prevent material from falling into or being carried to surface waters.	Tarps can work well on calm days.	Wind or poor weather negates use of tarps.	low	low	#2, p.21	
14. Clean debris, trash, sandings, paint chips, etc., from work areas immediately after any maintenance activity. Dispose of collected material properly.	Effective when done regularly.	Requires commitment and staff time; no preventative maintenance plan.	zero	low-moderate	#2, p.21	
15. When sanding or grinding hulls over a paved surface, vacuuming loose paint particles is the preferred way to clean up.	Effective when done regularly.	Unpaved work areas.	zero	low	#1	
16. Boat maintenance and storage practices, which minimize the need for scraping, sanding and painting should be encouraged.	Effective when done regularly.	When favorable working conditions do not exist.	low	low	#10, p.3-16	
17. The use of hose water for cleanup is to be minimized.	Use vacuum or brooms instead of water to clean surface areas.	Water use is hard to prevent since it is easy, fast and traditional.	zero	zero	#16, p.3-35	
<b>c. Other Upland Areas</b>						
BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Runoff and rinse water from boat maintenance and repair areas should be kept separate from ordinary parking lot/roof drainage runoff.	Where have paved parking lots and buildings near work areas.	Cannot always separate runoff away from maintenance area.	moderate	moderate	#10, p.3-43	Impermeable surface can be graded to move runoff to avoid contaminated surfaces.
2. Send runoff from work areas into natural or man made filters.	Where site has collection basins with ground filter.	Site may not be suitable for this; not natural filters.	moderate	zero	#20	No very contaminated runoff can be allowed to run into wetlands.
3. Parking lots should be swept regularly to remove debris.	Effective when done regularly where parking lot is paved.	Requires commitment and staff time; parking lot not paved.	low	low-moderate	#24, p.II-5-25	
4. Institute a preventive maintenance program that inspects and maintains storm water management devices.	Effective when done regularly.	Requires commitment and staff time; no preventative maintenance plan.	low	low	#2, p.B1	
5. Install a new, or maintain an existing oil and water separator.	Where site allows use.	Site may not be suitable for this.	expensive	high	#4, p.28	Traps and separators for inground drain systems.
6. The storm water drainage system, and/or pressure washing system, should be inspected on a monthly basis and after each major storm event, and cleaned as necessary to ensure the interception & retention of oils and solids entering the drainage system.	Wherever boat maintenance work & pressure washing are done on land near the water.	Requires commitment and staff time; no preventative maintenance plan.	low	low	#10, p.3-43	Effective when done regularly.

Table 1. Polluted Runoff, p. 9

<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Capital</b>	<b>Ops/Maint</b>	<b>Reference</b>	<b>Notes</b>
7. Install and maintain adequate buffer areas between coastal features and upland facilities.	Where site allows use.	Site may not be suitable for this.	low-high	moderate	#2, p.21	
8. Natural vegetation should be used for shoreline stabilization wherever feasible, and maintained in good condition by prompt repair and reseedling of washouts and other losses of vegetation.	Where site allows use.	Site may not be suitable for this.	low-high	moderate	#10, p.3-48	
9. Where storm water runoff from a marine facility discharges over an embankment and results in erosion, measures should be implemented to redirect this runoff to a stable outlet.	Where site allows use.	Site may not be suitable for this; erosion may be uncontrollable due to other factors.	low-high	moderate-high	#17, p.37	
10. Keep exposed soils covered with vegetation or temporary materials such as mulch.	Where site allows use.	Site may not be suitable for this.	low	low	#24, p.II-5-1	
11. Divert runoff from exposed soils or lower its velocity by leveling and terracing.	Where site allows use.	Site may not be suitable for this.	high-expensive	moderate-high	#24, p.II-5-45	
<b>d. Raising Awareness &amp; Education</b>						
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Estimated Costs</b>		<b>Reference</b>	<b>Notes</b>
			<b>Capital</b>	<b>Ops/Maint</b>		
1. Use pamphlets, flyers, newsletters, inserts, meetings, and workshops to convey the importance of any environmental precautions that have been instituted to staff, tenants and the public.	Traditional approaches to education; can be very effective if done right; Sea Grant can help.	Where no education program exists.	moderate	low	#23, p.5-57	Educational materials and programs are needed for Alaska; build on what is being done elsewhere.
2. Have adequate signage identifying best management practices.	Signs can work well when give clear instructions what to do; common education tool.	Not useful if only prohibit without giving alternative options; poor placement.	moderate	low	#2, p.22	Need list of typical signs to use & suggested locations for highest visibility & impact.
3. Insert language into contracts that require users and tenants to use certain areas and techniques when conducting boat maintenance and repair.	Effective if clearly written telling what is and is not allowed; legal agreement gives greater chance of enforcement.	Without enforcement, even good language does no good.	low	zero	#2, p.22	Need list of typical legal language to use.
4. Signs should be painted on or near storm drain inlets to indicate they are not to receive solid or liquid wastes.	Alerts people to where drainage goes; simple and effective.	Where storm drains do not exist; no signs on drains.	moderate	low	#4, p.35	Signs can also say "Waste dumped here goes into the harbor."

Table 1. Polluted Runoff, p. 10

# Solid Waste

a. **POTENTIAL PROBLEM:** Litter is the unfortunate mark of modern use of coastal waters and beaches. It comes in all kinds, colors, and sizes—bottles, plastic bags, aluminum cans, coffee cups, six-pack rings, disposable diapers, wrapping paper, glass bottles, cigarette filters, fishing line. Each piece of trash adds to a serious problem that can easily be prevented. Other types of solid waste, in addition to litter, also increase the volume of pollution in the water. Sportfish waste, for example, when gutted, cleaned, and discarded into the water can cause problems in marina basins with low flush rates. Too much fish waste in the same confined waterbody can rot and lower oxygen levels, resulting in foul odor and fish kill.

b. Vessel Operation & Marine Debris BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Encourage boaters to always carry a trash container aboard the vessel and to empty it into a proper on-shore disposal facility.	Effective when done routinely.	Requires committment and staff time; where users do not cooperate.	low	low	#25	Need education & promotion; fines for not complying with MARPOL regulations.
2. Encourage boaters to make it a policy that no trash is discarded overboard. If they had room to bring it out, they have room to bring it back.	Effective when done routinely.	History of tossing overboard is hard to change.	low	low	#18, #25	(same as #1), common sense needs to be taught & learned.
3. If it goes overboard, go back and get it.	Effective when done routinely.	Requires committment and staff time; where users do not cooperate.	zero	zero	#9, p.21	(same as #1)
4. Where possible, retrieve trash found in the water or on shore.	Effective when done routinely.	Requires committment and staff time; where users do not cooperate.	zero	zero	#18	
5. Do not throw cigarette butts overboard.	Easy to control if smokers understand.	Hard to control because few understand it is a problem; habits are hard to change.	zero	zero	#3	Floating filter tips is most common litter on water; include cigar butts.
6. Encourage the use of reusable containers.	Effective when done routinely.	Requires committment and staff time; where users do not cooperate.	zero	zero	#25	Encourage stores to stock food in reusable containers.
7. Carry less plastic aboard vessels to minimize the risk of inadvertent discharge.	Effective when done routinely.	Requires committment and staff time; where users do not cooperate.	zero	zero	#13, p.6	Litter is tossed or dropped, not discharged from boats.
8. Avoid bringing disposable plastic products onboard, especially plastic bags and six pack rings.	Effective when done routinely.	Requires committment and staff time; where users do not cooperate.	zero	zero	#3	
9. Remove unnecessary wrappings and packaging before boarding.	Effective when done regularly.	Requires committment and staff time; where users do not cooperate.	zero	zero	#13, p.6	
10. Install trash compactors on larger vessels.	Effective for larger vessels.	Not possible on small craft.	moderate	low	#18	
11. Comply with local MARPOL Annex V requirements.	Currently in federal, state and harbor codes; fines apply.	Without education, committment and enforcement, compliance is poor.	moderate-expensive	moderate-expensive	#11	Get MARPOL info. from US CG and harbormaster; education needed.

c. Repair & Maintenance in Boatyard Areas BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Develop and implement a waste management plan.	Daily operation in all harbors and marinas.	Requires commitment and staff time; where users do not cooperate.	moderate-expensive	moderate-expensive	#16, p.4-17	
2. Provide and maintain appropriate storage, transfer, containment and disposal facilities for solid wastes.	For all Alaska harbor facilities.	Where storage, transfer, containment & disposal facilities not available.	expensive	expensive	#20	
3. Provide covered containers for trash and solid wastes generated within the facility.	Common sense for all Alaska harbor facilities.	When common sense is not used.	moderate-high	moderate	#23, p.5-48	If containers leak, place on impermeable surface with berm.
4. Where possible, provide facilities for recycling of appropriate materials (e.g., glass, aluminum, plastic, trash, paper, cardboard, shrink-wrap, scrap metal).	Where possible, good way to reuse resources; can save money.	Recycling not yet economic or available in every harbor.	moderate-high	moderate-expensive	#23, p.5-58	Recycling needs new, creative options in Alaska to work well.
5. Dispose of all used batteries properly. Do not dispose of batteries in the marina's dumpsters. Marinas should accept old batteries for disposal and recycle.	Where possible, good way to reuse resources; can save money.	History of tossing overboard is hard to change; where recycling not practical.	moderate	high	#6, p.V2	
6. Old batteries awaiting recycling or exchange must not be left out on the dock or in the open air exposed to rain water.	Where possible, good way to reuse resources; can save money.	Recycling not yet economically practical or available in every harbor.	zero	low	#6, p.V46	
7. Waste disposal areas should be conveniently located with respect to repair and maintenance areas.	For all Alaska harbor facilities.	When common sense is not used.	zero-expensive	low	#17, p.43	Expensive if site needs to be developed or purchased.
8. Any waste receptacles placed on docks or near the waters edge should be secured to prevent accidental upset into the water.	For all Alaska harbor facilities.	When common sense is not used.	moderate	moderate	#17, p.43	Common sense needs to be taught & learned.
9. Encourage the use of recycled materials, and provide for the collection of recycleables.	Where possible, good way to reuse resources; can save money.	Recycling not yet economically practical or available in every harbor.	zero	high	#17, p.43	Need to get word out.
10. For boat storage, avoid disposable plastic covers. Use polyester covers instead, which last several seasons, or canvas covers which last even longer.	For all Alaska harbor facilities.	Sites without land storage near water.	low	moderate	#15, p.13	
11. Discourage the use of shrink-wrap, unless recycled. Where this (recycling) service is not available, make every effort to cut the plastic sheeting into useable tarps.	Where shrink wrap is used to store boats.	Where shrink wrap is not used.	zero	moderate	#6, p.V46	Shrink wrap is popular in the colder states in the lower 48.
12. Perform maintenance inside or over tarps to ease the cleanup process and prevent material from falling into or being carried to surface waters.	For all Alaska harbor facilities.	Where user continues to work outside without tarps or refuses to use buildings when available.	zero-moderate	low	#2, p.21	

Table 2. Solid Waste, p. 12

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
13. Clean debris, trash, sandings, paint chips, etc., from work areas immediately after any maintenance activity. Dispose of collected material properly and inspect areas daily.	For all Alaska harbor facilities.	Requires commitment and staff time; where users do not cooperate.	low	moderate-high	#2, p.21	Need to get word out; needs hazardous materials policy.
14. Spent sandblasting grit and debris should be stored under cover and in a manner that minimizes contact with process water or storm water.	Very good if material is collected on a regular basis.	Requires commitment and staff time; where users do not cooperate.	low	low	#4, p.38	Good for commercial vessels.
15. Let open paint cans dry thoroughly before disposing in trash.	Simple, easy to do, cost free.	Takes time and commitment.	zero	zero	#6, p.V9	Need to get word out.
<b>d. Tidal Grid, Drydock &amp; In-Water Repair &amp; Maintenance</b>						
BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. In or above-the-water maintenance and repair should not exceed 25% of the above water surface.	Harbor repairs, wet moorage, slips	When above-water maintenance exceeds 25%	zero	zero	#6, p.V15	Not sure what 25% is of? Does it mean work only on the top 1/4 of the hull?
2. Except where measures to contain and remove pollutants have been taken, maintenance should be limited to mechanical tasks only, such as propeller work, replacing zincs, hull inspection, replacing thru-hull fittings and like tasks.	Common practice in boatyards and tidal grids.	Usually bottom cleaning also done at same time.	zero	zero	#6, p.V16	Worn zincs should not be tossed into water, but collected and recycled.
3. Place tarps between boat and dock/grid when working over water, and reverse boat in work slip when necessary.	Wet moorage & slips	Foul weather conditions prevent use.	low	moderate	#6, p.V15	Reverse boat' means to turn it around to keep tarps under work.
4. Perform maintenance (whether in, or above the water) over tarps to ease the cleanup process and prevent material from falling into or being carried to surface waters.	Harbor policy for tidal grids & slips.	Foul weather conditions don't allow tarps to work effectively.	low	zero-moderate	#2, p.21	This is type of BMP which should be added to harbor policies.
7. Plug scuppers to reduce runoff of dust and debris during maintenance work.	Harbor policy.	Scuppers not plugged.	zero	zero	#15, p.12	
5. Encourage the use of dustless vacuum sanders for topside work in slips.	Harbor policy.	Vacuum sanders not purchased & available.	moderate-high	low	#22	State of the art in boat repair; available from marine distributors.
6. Clean trash, sandings, paint chips, etc., from work areas immediately after any maintenance activity. Dispose of collected material properly.	Very good if material are collected on a regular basis.	Requires commitment and staff time; where users do not cooperate.	zero	moderate	#2, p.21	
7. Prior to flooding dry-docks & tidal grids, floatable & low-density wastes, e.g., plastic, wood, & insulation, should be removed; sweep or vacuum accessible dry areas clean; after the vessel has been removed, clean remaining areas.	Harbor policy for tidal grids & slips.	Requires commitment and staff time; where users do not cooperate.	zero	moderate	#4, p.23	Also remove non-floatable & higher density materials, as well as any grease, oil, solvents, etc.

Table 2. Solid Waste, p. 13



BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
8. Any waste receptacles placed on docks or near the waters edge should be secured to prevent accidental upset into the water.	All harbor facilities.	Requires committment and staff time; where users do not cooperate.	zero	low	#17, p.43	
9. Paint and solvent mixing, brush cleaning, and similar activities should not be conducted on open floats or on structures over water, but should be done in an on-shore work area.	All harbor facilities.	Requires committment and staff time; where users do not cooperate.	zero	zero	#17, p.53	
10. Mix only the amount needed for the job.	All harbor facilities.	Requires committment and staff time; where users do not cooperate.	zero	zero	#9, p.28	Avoids waste & saves money.
11. Materials mixed in a separate work area and transferred to an outdoor work area for application should be carried in a tightly covered container of one gallon or less.	All harbor facilities.	Requires committment and staff time; where users do not cooperate.	zero	zero	#17, p.53	
<b>e. Fish Waste</b>						
BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Fish wastes may be disposed of in the offshore ecosystems (unrestricted open waters) from which the organism were originally harvested.	All areas outside harbor jurisdiction.	Tradition is hard to change; not viewed by many as problem; is not a problem in many Alaska harbors, so BMP may not be needed	zero	zero	#10, p.3-34	Needs ordinance with fines to enforce; education is key.
2. Fish wastes should not be disposed of in marina basins.	All waterways in city limits.	Tradition is hard to change; not viewed by many as problem; is not a problem in many Alaska harbors, so BMP may not be needed	zero	zero	#10, p.3-34	Needs ordinance with fines to enforce ONLY where fish waste is a real problem.
3. Fish wastes should not be recycled into surface waters in such a way that they will wash up on any shoreline, or cause odors or other nuisances.	All waterways inside harbor jurisdiction.	Tradition is hard to change; not viewed by many as problem.	zero	zero	#10, p.3-34	Needs ordinance with fines to enforce; education is key.
4. Cleaning of fish on docks and floats should not be permitted, unless fish wastes are contained (such as with a pan or plastic drop cloth) and disposed in an approved location.	All harbor facilities.	Tradition is hard to change; not viewed by many as problem; is not a problem in many Alaska harbors, so BMP may not be needed	high-expensive	high	#10, p.3-34	
5. Establish fish cleaning, recycling and/or composting areas where appropriate.	If handy, people will us it.	Needs site and maintenance.	high	moderate	#23, p.5-50	Needs ordinance with fines to enforce; education is key.
6. Recycle fish waste as bait or chum.	Where large volume and storage available.	Not easy for sportfishers to do between trips.	zero	zero	#10, p.3-34	Common practice where chum is widely used & storage is available.
7. Rinsewater drainage from fish cleaning areas should be free of solids and directed to a sand filter or sanitary sewer.	Harbor cleaning facilities	Sewers not available in many harbors.	moderate	high	#10, p.3-34	Needs ordinance with fines to enforce; education is key.
8. Never discard any fishing line overboard.	Harbor & waterways; MARPOL regulation.	Not viewed by many as problem.	zero	zero	#3	Tradition is hard to change; but MARPOL fines can be high.

Table 2. Solid Waste, p. 14

<b>f. Raising Awareness &amp; Education</b>				<b>Estimated Costs</b>			
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Capital</b>	<b>Ops/Maint</b>	<b>Reference</b>	<b>Notes</b>	
1. Use pamphlets, flyers, newsletters, inserts, meetings, and workshops to convey the importance of any environmental precautions that have been instituted to staff, tenants and the public.	Harbor/marina polity, public relations, ads, handouts.	No educational program used.	low	low	#23, p.5-57	Educational materials and programs are needed for Alaska; build on what is being done elsewhere.	
2. Have adequate signage identifying best management practices.	Every harbor & marina facility.	No signs posted.	moderate	low	#2, p.22	Need list of typical signs to use.	
3. Direct staff and tenants as to the proper disposal of all wastes through the use of signs, mailings, and other means.	Every harbor & marina facility.	No educational program used.	low	zero	#20	Need list of typical signs to use.	
4. Insert language into contracts that require users and tenants to use certain areas and techniques when conducting boat maintenance and repair.	Every harbor & marina facility.	Contracts not used.	low	zero	#2, p.22	Include in harbor code and leases.	
5. Signs should be painted on or near storm drain inlets to indicate they are not to receive solid or liquid wastes.	Every harbor & marina facility.	Sites without storm drains.	moderate	low	#4, p.35		
6. Remind boaters that the law requires all boats 25 feet and more in length to have a sign posted and visible where garbage is stored (e.g., in the galley) about the federal trash disposal regulations in MARPOL Annex V treaty.	Every harbor & marina facility.; all larger boats.		low	zero	#1	Build on existing MARPOL programs with USCG and harbormasters.	
7. Issue rules and regulations governing the conduct and location of fish cleaning operations.	Every harbor code & marina policy.	Outside harbors.	low	zero	#23, p.5-50		
8. Encourage boaters to clean their catch on their way back into port.	For all harbor & marina users.	No educational program used.	zero	zero	#1	Also fish can be cleaned as they are caught if action is slow.	

Table 2. Solid Waste, p. 15

# Liquid Material

a. POTENTIAL PROBLEM: As there are many solid wastes produced at marina facilities, so there are also many liquid waste materials produced.

Common examples include antifreeze, engine coolants, engine oil, paints, solvents, liquid cleaners, battery acid, and pesticides.

Small amounts of used antifreeze and engine coolants are toxic to fish, wildlife, pets and humans, and can harm many marine organisms when they enter the waterway

This is also true for other types of liquid material such as waste oil, pesticides, cleaners, solvents and paints.

b. Storage & Disposal BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Provide and maintain appropriate storage, transfer, containment and disposal facilities for liquid wastes, encourage recycling where possible.	Waste oil collection station: MARPOL regulation.	Recycling not always feasible in Alaska; inadequate storage, transfer, disposal availability.	expensive	expensive	#20	
2. Adhere to existing regulations pertaining to disposal.	Federal, state & harbor policy & codes; useful everywhere.	Failure to follow disposal regulations.	zero	zero	#2, p.41	Need stiff fines, enforcement.
3. Do not allow the disposal of liquid wastes, such as engine oil, antifreeze, paints, solvents, and pesticides into the trash.	Signs at all harbor dumpsters, trash containers.	Disagree dumping of hazardous material in harbor containers.	zero	zero	#19, p.34	Need stiff fines, enforcement.
4. Separate containers for the disposal of used antifreeze, oils, mineral spirits and other solvents should be available and clearly labeled.	MARPOL stations.	Failure to provide clearly labelled, separate containers.	moderate	moderate	#23, p.5-52	
5. Incompatible or reactive materials should be stored separately and in accordance with local fire code. Flammable or combustible liquid wastes should be securely stored outside until they can be removed from the premises.	Safety policy; harbor facilities	Failure to require storage of hazardous materials by proper methods.	moderate	moderate	#24, p.IV-5-12	In small towns without fire codes, ask the fire marshall or chief for advice.
6. Build curbs, berms, or other barriers around areas used for the storage of liquid materials to contain spills. Store materials in areas impervious to the type of materials stored.	Useful at all used oil collection stations; useful everywhere	Sites with insufficient land or bermed storage area.	expensive	moderate	#23, p.5-52	Capacity at 110% of largest container is a common volume.
7. Liquid products should be stored in closed containers on durable impervious surfaces.	All harbor facilities	Areas without closed containers in safe area.	low-expensive	moderate	#17, p.46	
8. Designated storage areas should be covered and the inside area sloped to a dead end sump where spilled product can be recovered. All drains should have positive control valves or devices.	Safety policy; spill response plan.	Facilities without adequate storage areas with spill controls.	moderate-high	moderate	#4, p.19	
9. Storage and disposal areas should be conveniently located with respect to repair and maintenance areas	Common sense; all harbors; policy, maintenance, planning procedures.	Facilities without repair & maintenance areas.	zero-expensive	zero	#17, p.43	Expensive if specific site needs to be developed or bought.
10. Storage and disposal areas should be away from flood areas and fire hazards.	Common sense; all harbors; policy, maintenance, planning procedures.	Facilities without repair & maintenance areas.	zero	zero	#6, p.V21	Need stiff fines, enforcement.

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
11. Inspect storage tanks and piping systems to detect potential leaks and perform preventative maintenance.	All harbor facilities; routine practice.	Failure to routinely inspect for leaks.	zero	low-moderate	#6, p.V50	Frequency depends on level of use; could be daily, weekly, monthly or annual.
12. Chemicals, solutions, paints, solvents, acids, caustic solutions, & waste materials, including used batteries, shouldn't be stored outside; store in a manner which will prevent the inadvertent entry of these materials into receiving waters.	All harbor collection stations; MARPOL	Facilities without indoor or covered waste storage area.	low-expensive	moderate	#17, p.46	
13. For small quantities of unusable solvents, let them evaporate.	Haz-mat policy; all harbors.	There are no sites where this practice cannot be applied.	zero	zero	#9, p.29	How small a quantity? 1/2 pint, 2 gal., or what?
14. Dispose of remaining paints and solvents by brushing on an old board. Construct an A frame for this activity and provide for can drying prior to proper disposal.	Harbor collection sites; haz-mat storage site	There are no sites where this practice cannot be applied.	zero	low	#9, p.29	A-frame is just an idea, should not be in a BMP.
15. Amounts of hazardous materials stored and used should be kept to a minimum.	Harbor collection sites; haz-mat storage site	There are no sites where this practice cannot be applied; hazardous waste sites may not be convenient.	zero	zero	#2, p.41	Can save money by not overstocking.
16. Leaking containers must be emptied promptly upon detection, either by transferring it to a non-leaking container or by disposing of it in the proper "waste" container.	Haz-mat policy; all harbors.	There are no sites where this practice cannot be applied.	low	low-moderate	#8, p.4	
17. Buy paints, varnishes, and thinners in sizes you can use within one year. That way you won't have to dispose of any stale product.	Good practice; applies everywhere.	There are no sites where this practice cannot be applied.	zero	zero	#15, p.13	Can save money by not overstocking.
18. Purchase only the amount of hazardous materials and liquids which are needed on a project basis.	Harbor collection sites; haz-mat storage site; ; applies everywhere.	There are no sites where this practice cannot be applied.	zero	zero	#6, p.V13	Can save money by not overstocking.
19. Every six months inventory chemicals in storage and properly dispose of outdated and unnecessary product.	Harbor collection sites; haz-mat storage site; ; applies everywhere.	There are no sites where this practice cannot be applied.	zero	low	#6, p.V13	

Table 3. Liquid Material, p. 17

c. Handling BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Develop and implement a waste management and spill response plan.	All harbor facilities	When no waste management & spill response plan exists.	low	low	#16, p.3-14	This BMP is typical of many which should be developed for statewide.
2. Containment and control materials appropriate to the materials stored should be kept in a clearly marked location, readily accessible to storage and work areas.	Key harbor locations	Where no containment equipment is present.	medium-high	medium-high	#17, p.48	Costs depend on type of material, volume & distance to disposal.
3. Paint and solvent spills should be treated as oil spills and shall be prevented from reaching storm drains, deck drains and subsequent discharge into the water.	Haz-mat policy; all harbors.	Failure to protect storm drains from these spills.	zero	low	#16, p.3-17	
4. Cleanup of any spills must begin immediately. Stop the source of the spill.	Haz-mat policy; all harbors.	When spill is not discovered until too late; lack of spill response plan.	low-expensive	low-expensive	#4, p.20	Fines can be very high.
5. Prohibit painting which uses aerosols or spray equipment in the open where over-spray can fall to the ground or receiving waters.	Harbor policy; wet slips, uplands	Facilities which allow or do no spraying.	zero	zero	#17, p.52	
6. Paint guns should be either High Volume Low Pressure (HVLP) or High Efficiency Low Pressure (HELP) which are rated at 65% efficient paint transfer, or electrostatic paint spraying methods.	All harbor user maintenance policy.	Facilities which allow or do no spraying; using spray guns with low efficiency.	moderate	low	#17, p.53	Higher efficiency guns can give up to 85% efficiency; saves paint & lowers cost.
7. Direct solvent from cleaning of spray equipment into containers to prevent evaporation and allow recycling.	Haz-mat policy; all harbors.	Facilities which allow or do no spraying.	moderate	low	#6, p.V13	
8. Paints, solvents and reducers should be mixed in a designated area away from the water and storm drains. These areas should be bermed, curbed, or over drip pans, and should be under cover, inside a building or shed is preferred.	Haz-mat policy; all harbors.	Facilities without designated or inside painting areas.	low-high	low	#4, p.22	Can be expensive if special area needs to be developed or purchased.
9. Materials mixed in a separate work area and transferred to an outdoor work area for application should be carried in a tightly covered container of one gallon or less.	Haz-mat policy; all harbors.	Facilities without designated or inside painting areas.	low-high	low	#17, p.53	
10. Drip pans or other protective devices should always be used for making or breaking connections, and all transfers of solvents, paints, and other hazardous materials.	Haz-mat policy; all harbors.	Where drip pans or other protective devices are not available or used.	high	low	#4, p.21	
11. Drip pans should be placed at locations where spillage may occur, such as connections, hose reels, and filler nozzles.	Haz-mat policy; all harbors.	Where drip pans or other protective devices are not available or used.	low	low	#4, p.21	
12. Use turpentine, solvents, and brush cleaners more than once by allowing solids to settle out.	Haz-mat policy; all harbors.	Facilities which do not allow or do boat painting.	zero	zero	#25	

Table 3. Liquid Material, p. 18

<b>d. Alternative Materials</b>						
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Estimated Costs</b>		<b>Reference</b>	<b>Notes</b>
			<b>Capital</b>	<b>Ops/Maint</b>		
1. Whenever possible use solvents with low volatility and coatings with low VOC content.	Haz-mat policy; all harbors.	Failure to use low VOC solvents & paints.	zero	low	#6, p.V13	What level is low VOC content?
2. Use water-based paints and solvents that are not as toxic.	Haz-mat policy; all harbors.	Water-based paints are not available for all marine applications yet.	zero	low	#6, p.V13	Not as toxic as previously used materials.
3. The use of non-toxic, high bonding, easily cleaned coatings should be encouraged.	Haz-mat policy; all harbors.	Non-toxic paints are not available for all marine applications yet.	zero	low	#17, p.52	
4. Avoid anti-fouling paint use whenever possible.	Haz-mat policy; all harbors.	Fresh water lakes & rivers only.	zero	zero	#21	Anti-fouling paint essential for saltwater use; paint mfgs. R&D are creating non-toxic boat antifouling paints.
5. Enforce the prohibition on the use of tributyltin (TBT) based paints.	Haz-mat policy; all harbors.	TBT can legally be used on aluminum hulls.	zero	zero	#2, p.41	TBT is one of best antifoulants invented, but kills widely around hull.
6. Switch to longer lasting or nontoxic anti-fouling paints.	Haz-mat policy; all harbors.	High cost of paints.	low	moderate	#21	(see #4 above), look for new paints over next decade.
7. Reuse thinners and solvents.	Haz-mat policy; all harbors.	Where thinners & solvents are not used.	zero	zero	#9, p.29	
8. Use propylene glycol based antifreeze (orange color) which is less toxic to the environment than ethylene based antifreeze (green color).	Haz-mat policy; all harbors.	Applicable everywhere.	low	low	#2, p.41	Antifreeze can easily be filtered & reused; saves money, gives longer use life.
9. New hull coatings, designed to reduce the leaching of copper, are being developed. Keep informed about new products and watch for effective substitutes to recommend to boaters.	Haz-mat policy; all harbors.	Wherever harbor & marina industry fails to keep up with technology.	moderate	high	#19, p.33	(see #4 above), look for new paints over next decade, including use of natural biocides & super slippery coatings; high prices expected to drop.
<b>e. Raising Awareness &amp; Education</b>						
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Estimated Costs</b>		<b>Reference</b>	<b>Notes</b>
			<b>Capital</b>	<b>Ops/Maint</b>		
1. Provide to users information on collection, recycling programs and source reduction for hazardous materials and liquid wastes.	All harbor users & staff.	Where no education program exists.	low	low	#2, p.41	Education program needs to be developed.
2. Direct users as to the proper disposal of all liquid materials through the use of signs, mailing, workshops, etc.	Haz-mat policy; all harbors.	Where no education program or signs exist.	moderate	moderate	#2, p.41	Need list of typical education and signs to use.
3. Provide proper signage for the reporting of spills.	Haz-mat policy; all harbors.	Where no education program or signs exist.	low-moderate	zero-low	#19, p.31	Tell folks how to report a spill, include phone number.
4. Insert language into contracts that recommends users dispose of hazardous materials in the proper containment facilities.	Haz-mat ordinance or coe amendment.	Where no designated containment facilities exist; sites used without contracts or leases.	low	zero	#2, p.41	Delete 'recommends' to make mandatory in contract; needs help of maritime attorney.
5. Signs should be painted on or near storm drain inlets to indicate they are not to receive solid or liquid wastes.	Haz-mat policy; all harbors.	Sites without storm drains.	low-moderate	zero-low	#4, p.35	Signs could also say "drains to fish habitat" or "to bay".

Table 3. Liquid Material, p. 19

# Petroleum Leaks and Spills

a. POTENTIAL PROBLEM: It is not infrequent to see a small fuel sheen on the water surface near docked boats, perhaps from a few drops or slow leak. A cup of oil could spread into a very thin oil sheen over more than an acre of calm water. A little goes a long way. Although it may only be a tiny amount from some boats, the cumulative impacts can be damaging and quite significant. Small gasoline spills, while they quickly evaporate before causing much environmental harm, can cause a safety problem. Hydrocarbons are a problem in the marine environment when fueling and oil changes result in improper disposal practices, e.g., dumping waste oil on the ground, in storm drain or dumpster.

b. Petroleum Spills BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Each facility should develop and maintain an oil spill response plan.	All harbor facilities.	No oil response plan available.	low	low	#20	Work with ADEC & USCG; amend code/policy; replace materials as used; educate.
2. Each facility should have adequate oil spill response equipment that is easily accessible and clearly marked.	Haz-mat policy, all harbors.	Failure to provide adequate oil spill response equipment.	moderate-expensive	moderate-expensive	#2, p.31	(same as above)
3. Inform your local harbormaster and fire department about your spill response equipment and plan.	All first responders, USCG, ADEC, city and staff.	Failure to inform local public safety department of oil spill response plan.	zero	zero	#2, p.31	(same as above)
4. When a spill occurs it should be reported, federal law requires it.	Users, staff; policy and code.	Failure to report spill.	zero	zero	#20	(same as above) Expensive if fined for failure to report spill.
5. Stop the source of the spill immediately.	Harbor/marina policy, all harbors.	Failure to stop the source of the spill immediately.	moderate	moderate	#6, p.V50	(same as above)
6. Deploy containment booms if the spill may reach the water.	Harbor/marina policy, all harbors.	Failure to deploy containment boom at spill site.	moderate	moderate	#6, p.V50	(same as above)
7. Cover the spill with absorbent materials.	Harbor/marina policy, all harbors.	Failure to use spill absorption materials; none available.	moderate	moderate	#6, p.V50	(same as above)
8. Contain the liquid until cleanup is complete.	Harbor/marina policy, all harbors.	Failure to contain liquid until the clean-up is done.	moderate	moderate	#6, p.V50	(same as above)
9. Use biological cleaners which eat and digest petroleum pollutants.	Harbor/marina policy, all harbors.	Failure to use biological cleaners; cleaners not available.	low	moderate	#20	(same as above); U. Alaska has done research on oil digesting bacteria; establish pilot projects or demos with Sea Grant.
10. Do not use emulsifiers or dispersants.	Harbor/marina policy, all harbors.	Lack of understanding not to use detergents on spills.	zero	zero	#6, p.V50	Familiar example to avoid: dishwashing detergent.
11. Keep the area well ventilated.	Harbor/marina policy, all harbors.	Area not well ventilated; no enclosures or buildings used.	zero	zero	#6, p.V50	(same as above)
12. Properly dispose of used spill response equipment.	Haz-mat policy, all harbors.	Proper disposal unknown or not available.	zero	low-moderate	#2, p.33	Recycle as possible.

<b>c. Fueling</b>			<b>Estimated Costs</b>			
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Capital</b>	<b>Ops/Maint</b>	<b>Reference</b>	<b>Notes</b>
1. For fueling operations, require a person in attendance familiar with the operation and trained in emergency system shutdown and spill response.	Harbor/marina policy, all harbors.	No qualified person at site.	zero	zero	#10, p.3-26	Maximum fine & enforcement needed; vessel owners, operators, users required to comply; education needed.
2. Fueling facilities and storage areas must be secured when not in use by appropriate shut-off devices and security locks.	Harbor/marina policy, all harbors.	No fueling facility present.	low	low	#10, p.3-27	(same as above); most fuel facilities are provided by private sector.
3. Promote the installation of fuel/air separators on air vents or tank stems of inboard fuel tanks to reduce the amount of fuel spilled into surface waters during fueling.	Every harbor/marina; policy; applies to all boats & vessels with inboard fuel tanks.	Outboard boats with portable tanks.	low	zero	#23, p.5-53	(same as c.1); USCG regulations require outside venting of inboard fuel tanks.
4. Use automatic shut-off nozzles to reduce the amount of fuel spilled into surface waters during fueling.	Harbor/marina policy, all harbors.	No fueling facility present; automatic shut not available.	moderate-high	low	#23, p.5-53	(same as c.1); not sure if automatic shut off works on boats with separate air vent?
5. Use fume return lines on automatic shutoff nozzles.	Harbor/marina policy, all harbors.	No fueling facility present; fuel station not designed for fume collection.	moderate-high	low	#20	(same as c.1)
6. Automatic shutoff nozzles should not have a holding clip to clip the nozzle open.	Harbor/marina policy, all harbors.	No fueling facility present; automatic shutoff not available.	zero	zero	#7, p.6	(same as c.1); not sure if automatic shut off works on boats with separate air vent?
7. Know fuel capacities prior to filling. Do not just top off tank.	Harbor/marina policy, all harbors.	No fueling facility present; user doesn't know capacity, ignores problem & insists on topping off tank.	zero	zero	#16, p.14	(same as c.1)
8. A petroleum absorbent pad should be held next to the nozzle while filling.	Harbor/marina policy, all harbors.	No fueling facility present; absorption pads not available.	low	low	#7, p.6	(same as c.1)
9. Place a bucket or pan at the fuel vent to catch accidental overflow.	Harbor/marina policy, all harbors.	No fueling facility present.	low	low	#9, p.24	(same as c.1); this practice may be hard or impossible to do on many boats; #c3 above is more effective system.
10. Provide a catch pan for customers to rest the fuel nozzle in when finished with fueling.	Harbor/marina policy, all harbors.	No fueling facility present; catch pan not available.	low	low	#6, p.V27	(same as c.1); pan is more effective when absorption sheet placed on bottom.

Table 4. Petroleum Leaks and Spills, p. 21



BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
11. Absorbent materials containing gasoline should be thoroughly aerated before disposing with the regular trash to remove gasoline vapors.	Used for gasoline leaks & spills.	Requires designated outdoor space; failure to aerate pads; no gasoline used.	zero	zero	#7, p.5	Education.
<b>d. Bilge Water</b>						
BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
1. Do not discharge bilge water if there is a sheen to it or if it contains solvents, detergents or other additives.	Harbor code, federal & state	Small outboard boats without bilge; inboard boat operator does not know oil is in bilge.	low	low	#4, p.31	Maximum fine & enforcement needed; vessel owners, operators, users required to comply; education needed.
2. Promote use of oil-absorbing materials in bilge areas of all boats with inboard engines. Examine these materials at least once a year; replace as necessary. Recycle them if possible, or dispose in accordance with petroleum disposal regulations.	Harbor/marina policy, all harbors; applies to all vessels with inboard engines	Disposal of used pads needs to be addressed in a way which is simple and not expensive.	low	low	#23, p.54	This is one of the most economical and effective approaches to preventing oil in bilge water from going overboard; materials available from marine distributor as bilge pads or pillows.
3. Prior to pulling the plug, the captain or lift attendant should inspect the bilge to ensure that no oil or fuel has been spilled into the bilge.	Harbor/marina policy, all harbors.	Failure to inspect bilge.	zero	low	#6, p.V19	(same as #d.1)
4. Bilges should be inspected and cleaned prior to the commencement of repairs or work that opens or penetrates the hull.	Harbor/marina policy, all harbors.	Failure to inspect bilge.	zero	low	#10, p.50	(same as #d.1)
5. Install a new, or maintain an existing oil/water separator.	Harbor/marina policy, all harbors.	Failure to inspect bilge.	zero	low	#4, p.28	(same as #d.1); Oil absorption pads will solve this problem in #d.2.
6. With permission from the municipal sewage system, discharge to the sanitary sewers.	Where sewers are available.	If no sewers present; permission not requested.	zero-expensive	low-expensive	#12, p.21	(same as #d.1); costs will vary depending on volumes to be discharged.
7. Treat water with a system designed for the treatment of pressure washing waste water.	Harbor/marina policy, all harbors.	No water treatment system is available; failure to treat water.	moderate-expensive	moderate	#12, p.22	(same as #d.1)

Table 4. Petroleum Leaks and Spills, p. 22

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
8. Compare the cost of equipment required to treat contaminated bilge water to the cost of contracting with a waste disposal company to haul the waste water away.	Harbor/marina policy, all harbors.	Cost comparisons not available; waste disposal company not available to harbor.	moderate-expensive	high	#12, p.22	(same as #d.1 and d.2)
9. Make supplies and equipment accessible for removing oil and fuel from bilge.	Harbor/marina policy, all harbors.	Supplies not supplied or used.	zero	low	#19, p.31	(see #d.2)
10. Use oil/water separators in the bilge water pump discharge line to prevent discharge of oily water.	Easy to use on boat.	Maintenance required; may slow flow rate if clogged; filters not available.	low	low	#6, p.V19	Use caution when adding anything which could block or slow overboard flow, see #d.2
11. Use non-alkaline, biodegradable bilge cleaners.	Products available; harbor policy.	May not be widely distributed or used.	low	low	#6, p.V13	
<b>e. Repair &amp; Maintenance</b>						
BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. The best technique for dealing with oil in the bilge water is to continually check for and fix those small leaks.	Harbor/marina policy, all harbors.	Failure to inspect for wear & leaks.	zero	low	#6, p.V16	Cost for equipment & capital improvements.
2. Inspect fuel lines and hoses for chaffing, wear, and general deterioration, replace with USCG type A.	Harbor/marina policy, all vessels.	Outboard boats; failure to inspect for wear & leaks.	zero	zero	#16, p.13	
3. Secure and prevent hoses from chaffing.	Harbor/marina policy, all harbors.	Outboard boats; failure to inspect for wear & leaks.	zero	low	#9, p.22	Prefer #2; is clearer than #3
4. Drip pans or other spill proof protective devices should be used to collect and transfer oil and other engine fluids.	Harbor/marina policy, all harbors.	Outboard boats; no drip pans used under inboard engine.	low	low	#17, p.50	Also recommend use of oil absorption pad in drip pan.
5. Use non-spill vacuum systems for spill proof oil changes or to pump out oily bilge water.	Harbor/marina policy, all harbors.	Spill proof oil changer not available or used.	low	low	#22	System available from marine distributor; can be profit center.
6. Keep oil absorbent pads and containment pan or tray under the engine at all times.	Harbor/marina policy, all harbors.	Pads and pan not available or used.	low	low	#9, p.22	
7. Clean bilge areas after engine maintenance work. When changing engine oil, wipe up any spills so the oil isn't accidentally pumped overboard with the bilge water.	Harbor/marina policy, all harbors.	Failure to clean up after maintenance work.	zero	low	#25	
8. Keep use of engine cleaners to a minimum.	Harbor/marina policy, all harbors.	Overuse of engine cleaners.	zero	zero	#15, p.13	
9. Keep engines tuned and operating at peak efficiency.	Harbor/marina policy, all harbors.	Poor maintenance; old engines.	zero	low-moderate	#15, p.13	Common sense BMP.

Table 4. Petroleum Leaks and Spills, p. 23

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
10. Use premium two-cycle oil designated with a TC-W II or TC-W3 code which burns ash free and prevents carbon deposits.	Harbor/marina policy, all harbors.	Not using premium two-cycle oil.	zero	low	#15, p.14	
11. For winter storage, add fuel stabilizer at storage concentrations (see product instructions) and mix the tank well. This allows use of all the fuel, and eliminates problems disposing of stale gas.	Harbor/marina policy, all harbors.	Failure to properly winterize engine for storage.	zero	low	#15, p.15	
12. Never let any coolant or antifreeze be dumped overboard or into storm drains.	Harbor/marina policy, all harbors.	Failure to institute education, recycling or disposal program.	moderate	low	#1	
13. Install containment berms around fixed pieces of machinery.	Harbor/marina policy, all harbors.	No fixed machinery present outdoors; failure to berm outdoor equipment.	moderate-expensive	zero	#6, p.V23	
14. Engines and engine parts should be stored on a covered impervious surface.	Harbor/marina policy, all harbors.	Improper outdoor storage of engines and parts.	moderate-expensive	zero	#7, p.9	
15. Engine parts washing should not be done over open ground, but in a container or parts washer. Parts must be rinsed or air dried over parts cleaning container. The dirty washing fluid must be recycled or disposed by a licensed waste hauler.	Harbor/marina policy, all harbors.	All parts washed indoors over concrete; failure to provide suitable container.	low-moderate	low-moderate	#7, p.9	
16. In engine maintenance and repair areas, plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly.	Harbor/marina policy, all harbors.	Failure to plug floor drains.	zero	zero	#6, p.V49	Alternative: install oil trap with filter cloth in drains; may not work when ground is frozen.
17. A separate container for the disposal and recycling of used petroleum products should be accessible to your tenants.	Harbor/marina policy, all harbors.	Containers not provided or properly labelled.	low	low	#2, p.33	Recycling waste oil by burning as heating fuel is commonly used; saves cost of disposal & new fuel.
18. Spill or waste grease shall be collected and put into the waste oil container. Residues remaining may be absorbed and disposed of with the regular trash.	Harbor/marina policy, all harbors.	Failure to institute education, recycling or disposal program.	low	low	#8, p.6	
19. Containment and storage facilities should be properly constructed and equipped with dead end sumps, positive control valves, and over spill protection systems.	Harbor/marina policy, all harbors.	Containment & storage facilities not present.	high-expensive	expensive	#24	

Table 4. Petroleum Leaks and Spills, p. 24

<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Capital</b>	<b>Ops/Maint</b>	<b>Reference</b>	<b>Notes</b>
20. Locate waste oil containers away from flood areas and fire hazards or protect them with appropriate fire protection systems.	Harbor/marina policy, all harbors.	Waste oil not stored; stored in dangerous area.	expensive	expensive	#6, p.V21	
21. Institute a recycling program for used oil filters and waste oils.	Haz-mat policy, all harbors.	Failure to institute a recycling program.	high	high	#2, p.33	(same as #16 above)
22. Oil or fuel filters must be crushed and drained before disposal or recycling.	Haz-mat policy, all harbors.	Failure to institute a recycling program.	low	low	#8, p.6	
23. Wide top pan funnels with screens are useful for draining oil filters prior to proper disposal.	Haz-mat policy, all harbors.	Screens not used.	low	low	#6, p.V23	
24. Waste oil should be removed from the site by a permitted waste oil transporter.	Harbor/marina policy, all harbors.	No waste oil transporter available.	moderate-high	high-expensive	#7, p.4	(same as above)
25. Whenever possible, waste gasoline should be filtered and used as fuel.	Haz-mat policy, all harbors.	Failure to institute a filter then recycle program.	zero	low	#7, p.5	(same as #16 above)
26. Recycle waste oil by burning as a heating fuel.	Haz-mat policy, all harbors.	Failure to institute a recycling program; waste oil burner not available.	high	high	#20	(same as #16 above)
<b>f. Raising Awareness &amp; Education</b>						
<b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Estimated Costs</b>		<b>Reference</b>	<b>Notes</b>
			<b>Capital</b>	<b>Ops/Maint</b>		
1. Provide information to marina tenants on collection and recycling programs for used oil, absorbing pads, and filters.	Haz-mat policy, all harbors.	No education program available; recycling not available.	low	low	#2, p.33	Alaska needs educational materials.
2. If you do not collect these materials, provide to your tenants a list of local facilities that do.	Haz-mat policy, all harbors.	No education program available; recycling not available.	zero	zero	#19, p.29	Need list of typical signs to use.
3. Direct marina patrons to the proper disposal of all hydrocarbon products through the use of signs, newsletters and other means.	Haz-mat policy, all harbors.	No education program available; recycling not available.	low	low	#2, p.33	Need list of typical signs to use.
4. Train staff in both fire safety and spill prevention/cleanup procedures.	Haz-mat policy, all harbors.	No education program available.	moderate-high	high-expensive	#20	Training programs needed; should be SOP for every harbor & marina.
5. Provide proper signage for the reporting of spills.	Haz-mat policy, all harbors.	No signs available.	low-moderate	low	#19, p.31	Tell folk how to report a spill, include phone number.

Table 4. Petroleum Leaks and Spills, p. 25

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
6. Instructions for operation of fuel pump should direct users to the location of absorbent materials and how to use the materials to remove the fuel immediately form the water or ground.	Haz-mat policy, all harbors.	No instructional signs or program available.	low	low	#19, p.31	Alaska needs educational materials.
7. Provide notice to tenants and other boaters that discharge of bilge and ballast water contaminated by oil, fuel or other regulated contaminants is illegal.	Haz-mat policy, all harbors.	No instructional signs or program available.	low	low	#19, p.31	Need language for use.
8. Promote the use of oil-absorbing materials in the bilges of all boats with inboard engines. Encourage your tenants to examine these materials at least once a year and replace them as necessary.	Harbor policy; simple to use on boat; very inexpensive; no moving parts; widely available; common sense approach	Old habits are hard to change; needs disposal option; no promotion or education program.	low	low	#23, p.5-54	Suggest start up by having harbor/marina give first oil pillow to each boat; have replacements for sale.
9. Insert language into contracts that recommends the installation of fuel/air vent separators and bilge oil absorbing materials.	Haz-mat policy, all harbors.	Language not available or included in contract.	low	zero	#2, p.33	Delete "recommends" if used in contract; need list of good language to use.

# Boat Sewage

a. POTENTIAL PROBLEM: Boat sewage may be a problem when dumped overboard without pretreatment. Who wants to look at sewage just pumped overboard? Although the volume of boat waste is not as great as a typical sewage treatment plant outfall, it still contributes to the overall problem of fecal coliform loading to the water body. Sewage from marine heads impacts water by adding extra nutrients that use dissolved oxygen and can stimulate algae growth, which in worst cases can grow so fast that it uses oxygen needed by fish and other organisms to live. When untreated waste goes overboard, it can contaminate shellfish, leading to potentially serious health problems.

b. Disposal BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Untreated sewage should never be discharged directly overboard.	All harbor facilities & waterways; federal & state law for coastal waters.	Open ocean; user disregards policy & pumps overboard in harbor or marina.	zero	zero	#9, p.12	Education needed; habits are hard to change; ordinance & fines to be enforced.
2. Encourage the use of land based sanitary facilities. Keep restrooms clean and accessible during the boating season.	Harbor/marina policy; maintenance schedule.	Sites without harborside restrooms.	expensive	high	#6, p. V45	Clean, dry, warm restrooms critical to modern marina service & customer satisfaction.
3. Boats with portable toilets must take them ashore to be emptied (into a sewage or septic system). Never dump them overboard.	All harbor facilities & waterways; federal & state law for coastal waters.	Open ocean; user disregards policy & dumps overboard in harbor or marina.	zero	zero	#1	Pumpout stations should include portable toilet dump stations where demand exists.
4. All marine facilities which have live-aboard vessels should have a fixed or portable pumpout system, maintain an agreement with an outside contractor, or be located within 0.5 mile of a pumpout facility obligated to provide pumpout service to tenants.	Harbor/marina policy for all harbors.	Facilities with no liveaboards.	zero-expensive	low-high	#8, p. 4	Outside contractor could offer portable pumpout service to boats; also consider direct connection of liveaboard boats to pumpout; liveaboards are continual source of untreated sewage unless serviced by pumpout.
5. If you have vessels within your facility that have on-board sanitation devices, consider installing a pumpout facility (fixed or portable).	Harbor/marina policy for all harbors.	Boats without holding tank; site not suitable for pumpout station.	expensive	high-expensive	#2, p. 49	Pumpouts being installed in many Alaska harbors.
6. Provide pumpout service at convenient times, at a reasonable cost, and make the equipment easy to use.	Harbor/marina policy for all harbors.	Cannot apply in harbors where pumpouts are not available; staff not available to meet needs.	high-expensive	high	#2, p. 49	Convenience to boater and times available important considerations.
7. Prohibit the disposal of fats, solvents, oils, emulsifiers, disinfectants, paints, poisons, diapers, and other similar products in drains and heads.	Harbor/marina policy for all harbors.	Improper disposal of items into heads.	zero	zero	#10, p. 3-39	Education is key.
8. Promote water conservation to reduce the total waste load to treatment systems.	Harbor/marina policy for all harbors.	Failure to promote water conservation.	zero	zero	#10, p. 3-40	Education is key.
9. Use biodegradable treatment chemicals in holding tanks.	Harbor/marina policy for all harbors.	Boats without holding tank; failure to use proper chemicals in holding tanks.	zero	low	#6, p. V43	Alternative is to not use any chemicals in holding tank; replace chemicals as needed.

BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
10. Keep the disinfectant tanks of Type I and II MSDs (boat toilets) full to insure proper operation.	Harbor/marina policy for flow-through with treatment boat toilets.	Boats with holding tanks.	low	low	#1	USCG regulation for approved flow-through MSD operation; chlorine bleach is a common disinfectant.
11. Place dye tablets in holding tanks to discourage illegal discharge.	Harbor/marina policy for all harbors.	Boats without holding tank; boat owners resist having tablet placed in tanks.	zero	zero	#23, p. 5-61	Requires active enforcement.
12. Promote low phosphate detergents to reduce the phosphorous loads to treatment systems.	Harbor/marina policy for all harbors.	Use of low phosphate detergents not promoted or accepted.	zero	low	#10, p. 3-40	Can buy off the shelf in most grocery stores.
13. Unless specifically designed to handle sanitary waste from vessels, such wastes should not be discharged to septic systems.	Maintenance schedule.	Facilities without pumpout stations or septic systems.	zero	zero	#10, p. 3-39	Others have found that septic systems can handle boat sewage.
14. Work with local and state governments and EPA to declare your harbor a no-discharge area.	Harbor/marina policy for all harbors.	Cannot apply for no-discharge for harbors without pumpouts; local government & users not aware of or ignore problem.	zero	zero	#2, p. 49	EPA approval needed for §312 'No Discharge Area' designation; involve USCG & ADEC.
<b>c. System Maintenance</b>						
BMP Examples	Where/When Useful	Issues For Alaska	Capital	Ops/Maint	Reference	Notes
1. Develop and adhere to a regular inspection and maintenance schedule for the pumpout equipment.	Harbor/marina policy for all harbors.	Facilities without pumpout stations; not providing a regular schedule.	zero	moderate	#2, p. 49	
2. Flush out hoses daily; never discharge flush water onto the ground or into the water.	Maintenance schedule.	Facilities without pumpout stations.	low	low-moderate	#5, p. 18	Flush out, for about 30 seconds, by sucking clean bay water up through the running pumpout system.
3. Disinfect suction connection by dipping in bleach or by spraying with disinfectant.	Maintenance schedule.	Pumpout stations not in use; failure to use disinfectant.	zero	low	#5, p. 18	
4. Maintain a dedicated fund for the repair and maintenance of marina pumpout equipment at public facilities.	Publicly owned pumpout facility; line item in budget.	Private marinas; harbors without pumpouts; harbor does not budget for this.	high	high	#23, p. 5-60	Maintenance budget important for public facilities; not so for private business.
5. Waste holding tanks, if above ground, should be secured and have a secondary containment area, including a concrete pad. This containment area should be inspected weekly to confirm the integrity of the tank and any connecting pipe and fittings.	Harbor policy; maintenance by staff.	Facilities without pumpout stations; holding tanks below ground.	high-expensive	high-expensive	#10, p.3-37	Below ground tanks are more common & can allow surface for other uses, e.g., parking.
6. Tanks should be pumped out regularly to prevent overflows and clogging of leachfield.	Harbor policy; maintenance by staff.	Facilities without pumpout stations; tanks not properly maintained.	high	high	#10, p.3-39	
7. Do not pave, allow vehicular traffic, or dispose of dredge spoils over septic tank or leachfield.	Harbor/marina policy for all harbors.	Facilities without pumpout stations; 'no parking' signs ignored.	zero	low	#10, p.3-39	Proper tank design could allow above ground parking; could use sandy dredge soils.
8. Storm water runoff, including runoff from rooftops and pavement, should be directed away from the leachfield to prevent inundation of the field.	Harbor policy; maintenance by staff.	Facilities without pumpout stations; improper drainage.	moderate-expensive	zero	#10, p.3-39	Could be expensive if need major reconstruction and/or land purchase.

Table 5. Boat Sewage, p. 28

d. Raising Awareness & Education BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Encourage the local harbormaster to enforce existing state and federal regulations pertaining to Marine Sanitation Devices (MSD) and the illegal discharge of boat sewage.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; failure to follow harbormaster regulations; no regulations adopted.	zero	zero	#2, p. 49	ADEC needs educational materials and programs for Alaska; build on what is being done elsewhere; EPA, USCG.
2. Provide educational information to customers and potential users.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; information not available.	low	zero	#2, p. 49	(same as #1 above)
3. Post signs prohibiting discharge of head waste from boats in your marina.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; signs not posted.	low	low	#19, p.32	Need list of typical signs to use; replace as needed with new signs.
4. Strictly enforce no-dumping rule; use signs and contracts; educate people not to dump or discharge into the water.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; no signs; users ignore signs.	low	low	#20	Need list of typical signs to use & education materials.
5. If you operate a pumpout facility, install adequate signs to identify the pumpout station, location, operating procedure, and hours of operation.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; no signs, inadequately worded, or poorly located.	low-moderate	low	#23, p. 5-58	Need list of typical signs to use.
6. If you do not have pumpout service, post notices indicating the location of the closest facility.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; no notices posted.	low	zero	#19, p.32	(same as #1 above)
7. Arrange maintenance contracts with contractors competent in the repair and servicing of pumpout facilities.	Harbor policy; team effort; all harbors.	Facilities without pumpout stations; contractors not available.	moderate	high	#23, p.5-60	Use harbor/marina staff when applicable; most important for publicly owned facilities.
8. Add language to contracts requiring the use of pumpout facilities and specifying penalties for the failure to comply.	Moorage, slip rental agreement, lease.	Facilities without pumpout stations; contracts not updated.	low	zero	#23, p. 5-61	(same as #1 above)
9. Formally advise your local government that you have a pumpout facility available and provide pertinent information, such as time of operation and fee.	Private marinas with pumpout service.	Public facilities; local government not notified.	zero	zero	#2, p. 49	Government has major role in public education; use flyers with list of pumpout stations, hours, cost, etc.

Table 5. Boat Sewage, p. 29



# Vessel Cleaning

a. **POTENTIAL PROBLEM:** Washing boat topsides, decks, and wetted hull surfaces are widely practiced during the boating season. There are basically two concerns to think about. If done sensibly, cleaning chemicals and excessive debris can be kept out of the environment. Many cleaners contain harsh chlorine, ammonia, phosphates and other caustic chemicals which can harm fish and microscopic plankton. Often their biggest impact occurs immediately on entering the water, decreasing rapidly as dilution occurs. If the product's label warns about potential harm to people's skin or eyes, it will harm aquatic life too. Eventually some of the chemicals find their way into the food chain and can build up in fish flesh which may be eaten by people.

b. Pressure Washing BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Whenever possible, do pressure washing away from the waterfront.	Harbor policy.	Where pressure washing not used; when upland area not available.	zero-expensive	zero	#20	Expensive if upland area needs to be purchased and developed.
2. Maintain designated wash areas with water impervious surface (concrete preferred) sloping to a drain or sump and containment structures e.g. berms or sloped drainage trenches. Waste water should not be allowed to drain to storm sewers or open waters.	Harbor policy.	Where pressure washing not used; surface & construction wash area not meeting standards.	expensive	high-expensive	#12, p.10	
3. Minimize the impacts of waste water created during pressure washing.	Harbor policy.	Where pressure washing not used; user not conservative with water.	zero	zero	#2, p.22	Education is key.
4. Remove solid marine growth, such as barnacles etc., in an adjacent area if possible. Do not mix growth with pressure washing waste water or sludge.	Harbor policy.	Where pressure washing not used; staff not available to remove growth; adjacent area not possible.	moderate	moderate	#12, p.10	
5. Implement diagonal trenches or berms and sumps to contain and collect waste water.	Harbor policy.	Where pressure washing not used; not possible to have berm & pumps.	expensive	moderate-high	#6, p.V48	Use near head of launching ramps & boatyard railways.
6. Discharge from pressure washing should be collected and treated by settling of solids and oil separation prior to discharge.	Harbor policy.	Where pressure washing not used; discharge area not available.	expensive	moderate-expensive	#4, p.30	
7. Treatment can be simple use of hay bales, filter fabric, screening, or sophisticated filtration using gross particulate separators, flocculation & coagulation.	Harbor policy.	Where pressure washing not used.	low-expensive	moderate-high	#14	Use to treat runoff pollutants from boat wash area; sophisticated filtration suitable for high volume hull cleaning, but can cost over \$100K.
8. Steam cleaning must be done on an impervious area designed to collect and contain the cleaning effluent.	Harbor policy.	Where pressure washing not used; no impervious surface available.	high	moderate	#8, p.7	

c. In-The-Water Cleaning BMP Examples	Where/When Useful	Issues For Alaska	Estimated Costs		Reference	Notes
			Capital	Ops/Maint		
1. Support the use of environmentally compatible products.	Harbor policy.	When not using environmentally compatible products.	zero	low-moderate	#2, p.22	Buy and use 'green' products.
2. To the extent practical, minimize the use of soaps and detergents in the marine environment	Harbor policy.	Improper soaps & detergents used.	zero	zero	#10, p.3-13	
3. Use "green" detergents and more elbow grease instead of harsh, toxic teak and hull cleaners.	Harbor policy.	Users lazy & use harsh detergents.	zero	low	#25	
4. Detergents and cleaning compounds should be phosphate free and biodegradable.	Harbor policy.	Use of improper detergents.	zero	low	#23, p.5-56	Buy and use 'green' products.
5. Discourage the use of detergents containing ammonia, sodium hypochlorite, chlorinated solvents, petroleum distillates or lye.	Harbor policy.	Users not heeding warning.	zero	low-moderate	#23, p.5-56	
6. Substitute natural cleaners for chemical-based ones, e.g., vinegar, lime juice, lemon juice, borax, baking soda, and liquid soaps (not detergents).	Harbor policy for recreational boats.	No education program; user resistance.	low	low	#1	
7. Cleaning, painting and varnishing of vessels in the water should be limited to interior surfaces and 'brightwork', where materials and spills can be contained.	Harbor policy.	Improper cleaning & painting by users.	zero	zero	#17, p.52	
8. Wash the boat hull above the waterline by hand. Where necessary remove the boat from the water and perform cleaning where debris can be easily cleaned up and properly disposed of.	Harbor policy; where boat hauling possible.	Weather conditions & space do not allow this procedure.	zero-expensive	zero-moderate	#23, p.5-55	Expensive if boat hauling equipment & land must be purchased.
9. Use hose low-volume nozzles, which shut off when released, to conserve water and reduce runoff from boat washing.	Harbor policy.	Lack of running water.	low	low	#1	Common sense idea.
10. When cleaning the bottom, do not abrade the surface.	Harbor policy.	Improper cleaning methods used.	zero	zero	#9, p.31	
11. Hire a professional diver. Make sure the diver does not raise a colored plume when cleaning the bottom.	Harbor policy.	Divers not available.	zero	moderate	#9, p.31	
12. Do not clean for 90 days from the time of a new application of bottom paint.	Harbor policy.	Procedure not followed.	zero	zero	#9, p.31	Unclear just why 90 days? Why not 15, 22 or 100?
13. Capture and filter pollutants out of runoff water with tarps, screens, and filter cloths.	Harbor policy.	Not using filters & cloths.	low-moderate	low-moderate	#20	

Table 6. Vessel Cleaning, p. 31

<b>d. Raising Awareness &amp; Education</b> <b>BMP Examples</b>	<b>Where/When Useful</b>	<b>Issues For Alaska</b>	<b>Estimated Costs</b>		<b>Reference</b>	<b>Notes</b>
			<b>Capital</b>	<b>Ops/Maint</b>		
1. Educate boaters about the use of environmentally compatible cleaners and appropriate cleaning techniques.	All Alaska harbor & boating public.	People to educate others not available.	low	low	#9, p.12	Need educational materials and programs for Alaska; build on what is being done elsewhere.
2. Encourage boaters to use frequent rinsing and elbow grease to reduce the need for cleaning product.	Harbor policy.	Failure to encourage boaters to follow proper cleaning methods.	zero	zero	#19, p.33	
3. Use pamphlets, flyers, newsletters, inserts, meetings, and workshops to convey the importance of any environmental precautions that have been instituted to staff, tenants and the public.	All Alaska harbor & boating public.	Education program not available.	low-moderate	low	#23, p.5-57	Need educational materials and programs for Alaska; build on what is being done elsewhere.
4. Have adequate signage identifying best management practices.	All Alaska harbor & boating public.	Education program & signs not available.	low-moderate	low	#2, p.22	Need sample sign language.
5. Consider changing to hard bottom paint at next haulout.	Harbor policy.	Correct paint not used; expensive to buy.	zero	low-high	#9, p.31	State of the art of bottom paints improving rapidly for longer lasting, lower impact coatings.
6. To complement anti-fouling paint, consider alternative products that prevent marine growth.	Harbor policy.	Products not available.	low-high	low-high	#9, p.31	What are they? Antifouling paint can't be eliminated yet.

Table 6. Vessel Cleaning, p. 32

# Boat Operation Management

**a. POTENTIAL PROBLEM:** Boat and personal watercraft traffic through very shallow water and nearshore areas at wake-producing speeds can suspend bottom sediments and erode shorelines, all of which can increase turbidity in the water column. Turbidity blocks the penetration of sunlight to underwater plants that need light for survival, and it reduces visibility for fish who rely on sight to catch their prey. Vessel traffic can also uproot submerged aquatic vegetation (SAV), which is habitat for fish and shellfish and food for waterfowl, recycles nutrients released from matter decomposing in the waterbody, and reduces wave energy at shorelines, thus protecting them from erosion. Vessel traffic also might churn up harmful chemicals that had been trapped in the sediments and might contaminate fish and shellfish that people eat. Propellers or jet drives, when in contact with the bottom, dig visible furrows across the soil and the vegetation, which can take years to recover.

b. Boat Operations in Shallow Water and Nearshore Areas  BMP Examples	Where/When Useful	Issues for Alaska	Estimated Costs		Ref.	Notes
			Capital	Ops/Maint		
1. Restrict boat traffic in shallow-water areas	Shallow-water boating areas; generally recommended	Loss of vegetated bottoms and shallow water habitat; increased suspended bottom sediments.	moderate	moderate	#23, pp. 4-95 to 98	Vegetated bottoms help limit erosion and resuspension of sediments.
2. Establish and enforce no-wake zones to decrease turbidity, shoreline erosion, and damage in marinas	Near-shore areas; universally recommended.	Increased damage to docks, floats and shorelines/shoreline erosion. Increased cost of maintenance dredging. Impaired biologically important nearshore habitats and the flora and fauna that live in them.	low	low	#23, pp. 4-95 to 98	Several Alaskan communities have ordinances which restrict boat speeds in specific areas. Wake control reduces damage to docks, floats and shorelines and saves cost of maintenance dredging; wave-free marina basins are more pleasant for boaters.
3. Establish guidelines for personal watercraft operation to preserve natural resources.	Near-shore and shallow water areas, especially where marine wildlife and delicate ecosystems exist.	Personal watercraft are defined as Class A inboard boats by the U.S. Coast Guard and are required to follow most boating regulations.	low	low	#23, pp. 4-95 to 98	Several Alaskan communities have ordinances which restrict boat speeds in specific areas.

c. Raising awareness & education  BMP Examples	Where/When Useful	Issues for Alaska	Estimated Costs		Ref.	Notes
			Capital	Ops/Maint		
1. Mark areas with signs and buoys; include sensitive shallow area restrictions on navigation charts; post charts on marina bulletin boards.	Shallow-water boating areas; generally recommended	Loss of vegetated bottoms and shallow water habitat; increased suspended bottom sediments.	moderate	moderate	#23, pp. 4-95 to 98	Vegetated bottoms help limit erosion and resuspension of sediments.
2. Consider posting "no-wake" signs near shoreline areas in the marina; solicit the local government to establish no-wake zones where shoreline erosion might be a problem.	Near-shore areas; universally recommended.	Increased damage to docks, floats and shorelines/shoreline erosion. Increased cost of maintenance dredging. Impaired biologically important nearshore habitats and the flora and fauna that live in them.	low	low	#23, pp. 4-95 to 98	Several Alaskan communities have ordinances which restrict boat speeds in specific areas. Wake control reduces damage to docks, floats and shorelines and saves cost of maintenance dredging; wave-free marina basins are more pleasant for boaters.
3. Consider posting guidelines for responsible watercraft operation near shoreline areas in the marina; solicit the local government to establish no-wake zones where shoreline erosion might be a problem and to restrict personal watercraft use in shallow water areas..	Near-shore and shallow water areas, especially where marine wildlife and delicate ecosystems exist.	Personal watercraft are defined as Class A inboard boats by the U.S. Coast Guard and are required to follow most boating regulations.	low	low	#23, pp. 4-95 to 98	Several Alaskan communities have ordinances which restrict boat speeds in specific areas.

Table 7. Boat Operation Management, p. 34

## IV. Appendix A. ANNOTATED REFERENCE LIST

1. Amaral, Mark and Neil Ross. 1993. Boater Environmental Fact Sheet: Nonpoint Pollution From Boats. Prepared by the International Marina Institute as a public information flyer under a grant from the US Environmental Protection Agency. International Marina Institute, Wickford, RI.  
*Description:* This is a nonpoint source pollution fact sheet series created for boater education and public awareness. The series provides clear, concise, common sense information on the nonpoint source pollution problems, and the things that boaters can do to reduce their contributions. A useful aspect of this publication is that it makes for a very good educational handout, posting and/or mailing. (10 pages)  
*Source:* International Marina Institute, tel. 401-294-9558 (also printed in references #2 & #6).
2. Amaral, Mark and Virginia Lee. 1994. Environmental Guide for Marinas: Controlling Nonpoint Source and Storm Water Pollution in Rhode Island. Rhode Island Sea Grant Publications and the Coastal Resource Center, Narragansett, RI.  
*Description:* This comprehensive guide provides the standard information including an overview of the nonpoint source pollution problem, federal regulations, pollutant impacts and fates, and BMPs. In addition this guide goes the next step with an easy to use method for the development of individual facility Operation and Maintenance Plans (OMPs). Included with this framework for compliance with Rhode Island's Coastal Nonpoint Pollution Control Program, this document also provides useful examples of completed OMPs, an oil spill response plan, with a detailed reference source and selected publications section. (150 pages)  
*Source:* Rhode Island Sea Grant, tel. 401-792-6842, order # P1374.
3. Clean Ocean Action. (undated). Ten Tips for a Cleaner Ocean: A Recreational Boaters Guide. Prepared by Clean Ocean Action, with the help of the Chesapeake Bay Foundation, Highlands, NJ.  
*Description:* This fact sheet offers ten tips for reducing pollution associated with vessels. (1/2 page)  
*Source:* Clean Ocean Action, tel. 201-872-0111.
4. CH2M Hill, Inc. 1993. Best Management Practices for Ship and Boat Building and Repair Yards. Prepared for the Puget Sound Shipbuilders Association and the Puget Sound Water Quality Authority, Seattle, WA.  
*Description:* This document, a joint effort of industry and regulators, is designed for use by boat builders and ship repair yards. The document provides twenty BMPs for the industry and provides an extensive list of local contacts. A useful aspect of this document is the hazardous waste disposal chart contained in BMP #19. (38

pages)

*Source:* Puget Sound Shipbuilders Association, tel. 206-323-6400.

5. Coastal Technology Inc. 1990. A Guidebook for Marina Owners and Operators on the Installation and Operation of Sewage Pumpout Stations. Prepared for the Maryland Department of Natural Resources Boating Administration, Annapolis, MD.

*Description:* This guidebook is part of an ongoing effort by the Maryland DNR to encourage the installation and operation of marine sewage pumpout stations. It provides general information on the design, construction, operation, maintenance of marine pumpout stations, and explains the importance of installing pumpout stations from both an ecological and business standpoint. (53 pages)

*Source:* Maryland Department of Natural Resources Boating Administration, tel. 410-974-2908.

6. Dodson, Paul. 1994. Practices and Products for Clean Marinas: A Best Management Practice Handbook. Published by the International Marina Institute, Wickford, RI.

*Description:* This book, gleaned from many IMI sources, was written to be useful in all of the United States and internationally. The focus is on BMPs as techniques to control, reduce or eliminate the sources and affects of pollution from marinas, boatyards, yacht clubs, municipal docks, etc. Individual sections on: public and private programs for clean water; types of pollutants and their affects; facility considerations, practices and products; operation and maintenance BMPs and products; and education. A useful aspect of this publication is that it provides information on where and how BMP products can be purchased. (120 pages)

*Source:* International Marina Institute, tel. 401-294-9558.

7. Florida Department of Environmental Resources Management. 1993. Marine Facilities Best Management Practices. Metropolitan Dade County Florida Department of Environmental Resources Management, Miami, FL.

*Description:* Details best management practices for marine facilities to implement in obtaining their annual operating permits from the FL Department of Environmental Resources Management. Topics include: manatee protection, hurricane preparedness, petroleum products, and hull maintenance. (11 pages)

*Source:* FL Department of Environmental Resource Management, tel. 305-372-6581.

8. Florida Department of Natural Resource Protection. 1992. Pollution Prevention and Best Management Practices for Marine Facilities. Broward County Department of Natural Resource Protection, Division of Pollution Prevention and Site Remediation Programs, Fort

Lauderdale, FL.

*Description:* Details best management practices for Broward County's marine facilities. The document covers these topics: discharge of sewage from vessels; bilge water; petroleum handling, storage, and spills; fueling; batteries; cleaning; bottom paint; sanding; spray painting; engine parts, storage, and washing; disposal of solid waste; manatee protection; hurricane preparedness; and tenant notification. (11 pages)

*Source:* FL Department of Natural Resource Protection, tel. 305-519-1260.

9. Forty Eight Degrees North. 1993.

Sound Watch: An Environmental Guide for Boaters. Published by Forty Eight Degrees North, Seattle, WA.

*Description:* This guide, well suited to it's Northwest audience's needs, contains sections titled: heads, holding tanks and pumpout stations; galley slaves and garbage rats; twin jimis and iron jennies; Zen

and the art of boat maintenance; and BMPs for boatyards and marinas. Although in the Washington context, this format could be very useful for boater education anywhere. (63 pages)

*Source:* Forty Eight Degrees North, tel. 206-789-7350.

10. Fugro, McClelland. 1992. Best Management Practices for Coastal Marinas. Final report for Connecticut Department of Environmental Protection, Office of Long Island Sound Programs, Hartford, CT.

*Description:* This report examines the impacts of marina construction, expansion, and operation on the coastal waters of Connecticut. It provides an overview of potential impacts from marina facilities; identifies operational and structural practices for addressing those potential impacts (BMPs), and suggests mechanisms for implementing these practices (one, two and three tiered strategies). (166 pages)

*Source:* CT DEP, Office of Long Island Sound Programs, tel. 203-424-3034.

11. McCorkle, George. 1995. Personal Communication. Kodiak, AK. June 8, 1995.

12. Metro. 1991. Shipyard Waste Water Treatment Guidelines.

Municipality of Metropolitan Seattle Water Pollution Control Department, Industrial Waste Section, Seattle, WA.

*Description:* This guide specifically addresses waste water. It contains information on: selecting a discharge route; collecting and treating pressure washing waste water; treatment and disposal of bilge and ballast water. A particularly useful aspect is the detailed evaluation of different treatment techniques such as mixed media filtration, ultrafiltration, chemical flocculation, and induced air filtration. (50 pages) (*Note: Double check with Metro before adopting any of the treatment techniques described; experience has shown several do not work as well as expected.*)

*Source:* Metro, tel. 206-689-3000.



13. Marine Law Institute. 1990. Dumping of Plastics Prohibited: Requirements of MARPOL Annex V. University of Maine School of Law, Marine Law Institute, Sea Grant Marine Advisory Program, Portland, ME.  
*Description:* This Citizens' Guide discusses the legalities of MARPOL Annex V, and its specific requirements. In addition it offers several pointers on how to limit marine debris from vessels. (7 pages)  
*Source:* Marine Law Institute, Pamphlet #2, Citizens' Guides to Ocean and Coastal Law, tel. 207-780-4141.
14. Natchez, Daniel S. 1994. *The Perplexing Problems With Power Washing And Associated Practices*. A two-part series in Marina/Dock Age, March/April & May/June, Niles, IL.  
*Description:* This two part series directly addresses the collection, treatment, and disposal of waste water created from the practice of pressure washing. (4 pages)  
*Source:* Marina/Dock age, tel. 708-967-1810.
15. National Marine Manufactures Association. (undated). Water Watch: What Boaters Can Do To Be Environmentally Friendly. A project of The Foundation for Recreational Boating Safety and Education, The Environmental Council for the Boating Industry, and The National Marine Manufactures Association, Chicago IL.  
*Description:* This educational handout is designed for distribution to boaters. The topics covered include sanitary waste, hull maintenance, vessel cleaning, fueling, engine maintenance, bilge water, and fishing. For each topic a brief discussion of the problem is given, then actions which boaters can take to address the problem follow. The information in this publication is concise and easily understood. A useful aspect of this publication is that it is applicable to all regions, and therefore makes an excellent educational handout. (15 pages)  
*Source:* National Marine Manufactures Association, tel. 312- 836-4747.
16. NMTA. 1992. NPDES Handbook for Compliance with Washington State Department of Ecology: NPDES Boat Yard Permits. Northwest Marine Trade Association, Seattle, WA.  
*Description:* This very well organized document is designed to assist Washington State marina and boatyard operators through the NPDES permitting process. The BMP topics in this guide include yard maintenance; paint chemical and oil management; and education. (270 pages)  
*Source:* Northwest Marine Trade Association, tel. 206-634-0911.
17. Nyman, David. 1994. Maine Marine Facilities Management of Nonpoint Source Pollution: Facilities Survey and Report. Prepared Fugro East, Inc, on behalf of the Maine Marine Trades Association for the Maine State Planning Office, Biddeford, ME.  
*Description:* This report was

prepared in order to summarize the results of the marine facility surveys conducted, identify the pollutants of primary concern, and discuss methods for preventing the pollution problems found. The document provides management practices for storm water control, shoreline stabilization, fueling stations, boat sewage, solid waste management, oil and hazardous materials, vessel cleaning, and boat operation. (55 pages)

*Source:* Maine Marine Trades Association, tel. 207-282-8814.

18. O'Hara, K. 1991. Tossing This Trash Overboard Could Leave Death In Your Wake. Center for Marine Conservation, Washington, D.C.

*Description:* This educational, fold out, flyer deals with marine debris and MARPOL Annex V. This handout is very brief and contains approximately six best management practices for boaters. (1 page)

*Source:* Center for Marine Conservation, tel. 202-429-5609

19. Puget Soundkeeper Alliance. 1995. *Section 4: Recommended BMPs. Clean Marinas+Clean Boating+Clean Water Partnership: A Resource Manual for Pollution Prevention in Marinas*. Prepared by the Puget Soundkeeper Alliance on behalf of the Puget Sound Water Quality Authority, Seattle, WA. (36 pages)

*Description:* Section four of this document details recommended best management practices for marinas. This nine page section addresses both the problems and solutions related to controlling sources of oil and fuel contamination, pumpout facilities and keeping sewage away from the sound, boat cleaning and maintenance in the slip, and solid and hazardous waste disposal.

*Source:* Puget Sound Water Quality Authority, tel. 206-407-7300.

20. Ross, Neil. August 1994. *Marina Pollution: Exaggerated But Real. Soundings Trade Only* Soundings Publications, Inc, Essex, CT.

*Description:* This article briefly discusses some of the impacts of nonpoint source pollutant contributions from marinas, and the basics of common sense pollution control for marinas.

*Source:* Soundings Publications, tel. 203-767-3200.

21. Ross, Neil. October 1994. *How to Control Paint Pollution Risk. Soundings Trade Only*. Soundings Publications, Inc, Essex, CT.

*Description:* This article specifically addresses pollutants from the application, cleaning and removal of marine paints. In addition it offers control measures, or best management practices, which can be used at marinas.

*Source:* Soundings Publications, tel. 203-767-3200.

22. Ross, Neil. June 1, 1995. Personal Communication. Kingston, RI.

23. United States Environmental Protection Agency. 1993. Guidance Specifying Management Measures for

Sources of Nonpoint Pollution in Coastal Waters. US Government Printing Office, Washington, DC. EPA-840-B-92-002.

*Description:* This is the technical manual which Congress required (under the Coastal Zone Act Reauthorization Amendments of 1990) the EPA to produce. The manual is designed to guide the states development of Coastal Nonpoint Pollution Control Programs. As part of that program, states are required to address marinas and therefore the manual specifically addresses these pollutant sources. The Chapter 5 on marinas includes management measures and best management practices for both marina siting and design, and operation and maintenance. (670 pages)

*Source:* National Technical Information Service, tel. 800-553-6847, #PB 93-234-672.

24. Washington State Department of Ecology. 1992. Storm Water Management Manual for the Puget Sound Basin: The

Technical Manual. Department of Ecology, Olympia, WA.

*Description:* The Puget Sound Water Quality Management Plan directed the State Department of Ecology to develop this technical manual which addresses erosion and sediment control, runoff control, and urban land uses. This manual is basically a storm water BMP manual intended for use by local governments, tribes, and the Department of Transportation in the Puget Sound basin. The document is made up of four volumes with 22 chapters. It is very useful for its detailed technical content and design criteria. (700 pages)

*Source:* Washington State Department of Ecology, tel. 206-459-6000.

25. Washington State Parks and Recreation Commission. 1991. Boaters Guide: How to Have Clean Safe Fun Afloat. Washington State Parks and Recreation Commission, Boater Environmental Education Program, Olympia WA. (1 page flyer)

*Description:* This folding handout is an educational tool which contains information on boating safety, clean water, marine debris, hazardous waste, boat and engine maintenance, sewage and local pumpout locations.

*Source:* Boater Environmental Education Program, tel. 206-586-8686.

## IV. Appendix B. Alaska's Cross Continental Consulting Team

### Concepts Unlimited

- **Lois Hansen**, Owner, Box 4108, Kodiak, AK 99615, new tel. 505-866-5960, fax 505-866-5956, email: loishansen@aol.com - Publisher and editor of Home Port Alaska, circulation of over 6,000 major emphasis commercial fishing, safe practices, & issues that effect coastal living: • Coordinated and organized numerous projects, events, conferences & workshops; • Extensive experience with radio and television & as a public speaker; • Author of numerous curriculum guides, career study guides, vocational plans, articles.
- **George V. "Corky" McCorkle**, P.O. Box 1032, Kodiak, AK 99615 - Senior Harbormaster/ Port Administrator (retired) in the State of Alaska. Over 24 years experience port & harbor management experience with the Port of Kodiak, largest & most diversified fishing

fleet in Alaska: • St. Herman Harbor Breakwater Project, multi-million dollar project; • St. Herman Inner Harbor Dock & Float Facility and Trident Basin Seaplane Facility; • Conceptual Plans - Port of Kodiak 15 year development planning; • AK Association of Harbormasters & Port Administrators co-founder & life-time member; • Pacific Coast Congress of Harbormasters & Port Managers, awarded Life Membership 1995; • Charter member Ports Alaska.

### Neil Ross Consultants

- **Neil W. Ross**, PO Box 56, Kingston, RI 02881-0056, tel./fax 401-782-2116, mail: neilross@aol.com - Professional experience in applied technical research, information and educational services to the marina industry, marine trade associations, government agencies, civic, environmental organizations in 12 nations and 39 states. Internationally recognized marina authority on: • Environmental management, BMP, and proactive advocate for clean marinas & waterway; • Marina facility planning & expansion; coastal planning for boating access;

- Boat sewage control & pumpout grants; • Automobile parking & usage standards for marinas; • Building marina professionalism; • Applied information gathering & research experience; • Over 235 technical reports, articles & books published on marinas & the environment; • Intimate familiarity with CZARA NPS marina guidance & CVA pumpout guidelines.

- **Mark Amaral**, 35 Crestwood Rd, Warwick, RI 02886 - Marine Research Specialist, Coastal Resources Center, University of Rhode Island, Kingston, RI. Research on coastal zone management issues and apply findings through outreach and technical assistance: • Authored RI's 1994 Nonpoint Source Pollution Policy and Guidance for Marinas; • Coordinating a national network of Sea Grant Marina Advisory Service Professionals; • Advisor to state environmental policy makers regarding marina management; • Harbormaster (former), Barrington, RI, managing all waterborne activities and issues; • Internationally recognized authority on marina and coastal issues; • Published numerous books, technical

reports, articles on marinas and the environment.

- **Jared L. Rhodes**, 735 Willet Av, East Providence, RI 02915 - Diverse professional experience and extensive training in coastal management, planning, and pollution prevention approaches for harbors and marinas: • Graduate Student - URI Community Planning & Area Development; • Certificate of Completion - RI Harbormaster Association, Harbormaster Training Program; • Marina Outreach and Best Management Implementation Project; • Cove Haven Marina - worked in general boat maintenance & repairs.

## IV. Appendix C. LITERATURE SEARCH PROCESS

The identification of all recent information sources containing relevant BMPs task was accomplished through traditional data gathering techniques and an extensive electronic search on computer through the Internet. Two approaches were used to gather best management practice reference sources via the computer.

The first, involved the use of the Internet gopher client/server which facilitates access to thousands of information servers throughout the world. For the purposes of this project, "gopherspace" was searched using Veronica. Veronica is a resource discovery system which provides access to most (99%+) of the world's gopher servers. In addition to gopher data, Veronica includes references to many information servers provided by other types of information servers, such as World Wide Web (WWW) servers, Usenet archives, and Telnet-accessible information services. Currently there are approximately 5,057 gopher servers, 3,905 WWW

servers, and 1,000 Telnet servers indexed.

Veronica queries are keyword-in-title searches. A simple query can be very powerful because of the large number of references indexed. The key words used in the search conducted for this project included: nonpoint source pollution, best management practices, Coastal Nonpoint Source Pollution Control Program, storm water pollution, The Clean Water Act, Coastal Zone Act Reauthorization Amendments, marina, boat yard, harbor, boats, vessels, yachts, source, control, delivery reduction, waste disposal, spill response, and tidal grids. Each of the individual searches resulted in numerous gopher menus containing even more numerous information items who's titles contained the specified key words. Of these information items approximately 150 items were found to be related. This group was then reviewed and, where appropriate, combined with the project team's "on-hand references."

The second approach utilized in this process, involved the "questioning" of various national and international experts, professionals and academics

through the use of the TELEC Electronic Conference and Network Mailing Lists. This is a user interface program which allows access to the discussions and mailing lists archives maintained by the GRAND Conferencing System. The information in this server is organized into broad categories called conferences, which are collections of related topics. In turn each topic is made up of one or more entries. An entry is the smallest piece of information that TELEC can manipulate as a unit, and roughly corresponds to one item of mail.

In posing the "question," an entry entitled "Marina BMPs Wanted" was posted onto the COASTNET topic of the public conference. The posting itself, brought back many national, and even a few international, responses. Responses included everything from "here is what is currently accepted in my locality," to "we are also trying to address this issue, could you please provide us with any information that you may have." Through the use of this approach, valuable contacts were quickly established in widely separated areas such as Washington DC, States of Washington, California, Florida, plus nations of Taiwan and Israel.

## **IV. Appendix D. ALASKA MARINA & HARBOR BMP REVIEWERS**

Team Alaska ground truth manager.....

1. Joy Baker, Harbormaster  
Port of Nome, Box 281, Nome,  
AK 99762  
907-443-2918  
ax 907-443-5349
2. Denny Erlandson, Harbormaster  
Port of Homer, 4350 Homer  
Spit Rd., Homer, AK 99603  
907-235-3160  
fax 907-235-3152
3. Joseph Graham, Harbormaster  
Port of Juneau, 155 S. Seward  
St., Juneau, AK 99801  
907-586-5255  
fax 907-586-2507
4. Stuart Greydanus, Harbormaster  
Port of Bethel, Box 388, Bethel,  
AK 99559  
907-543-2310  
fax 907-543-2311
5. George 'Corky' McCorkle  
Concepts Unlimited  
Kodiak Harbormaster (retired)
6. David Mork, Harbormaster  
City of Sitka, 617 Katlian St.,  
Sitka, AK 99835  
907-747-3439  
fax 907-747-3010
7. Craig Wiese, Marine Advisor  
University of Alaska-Fairbanks,  
Sea Grant Marine Advisory  
Program  
2221 E. Northern Lights Blvd.  
#110, Anchorage, AK 99508  
907-274-9691  
fax 907-277-5242
8. Rick Wolfenberger, Manager  
Fisherman's Bend Marina, PO  
Box 210627, Auke Bay, AK  
99821  
907-789-7312  
fax 907-789-7312