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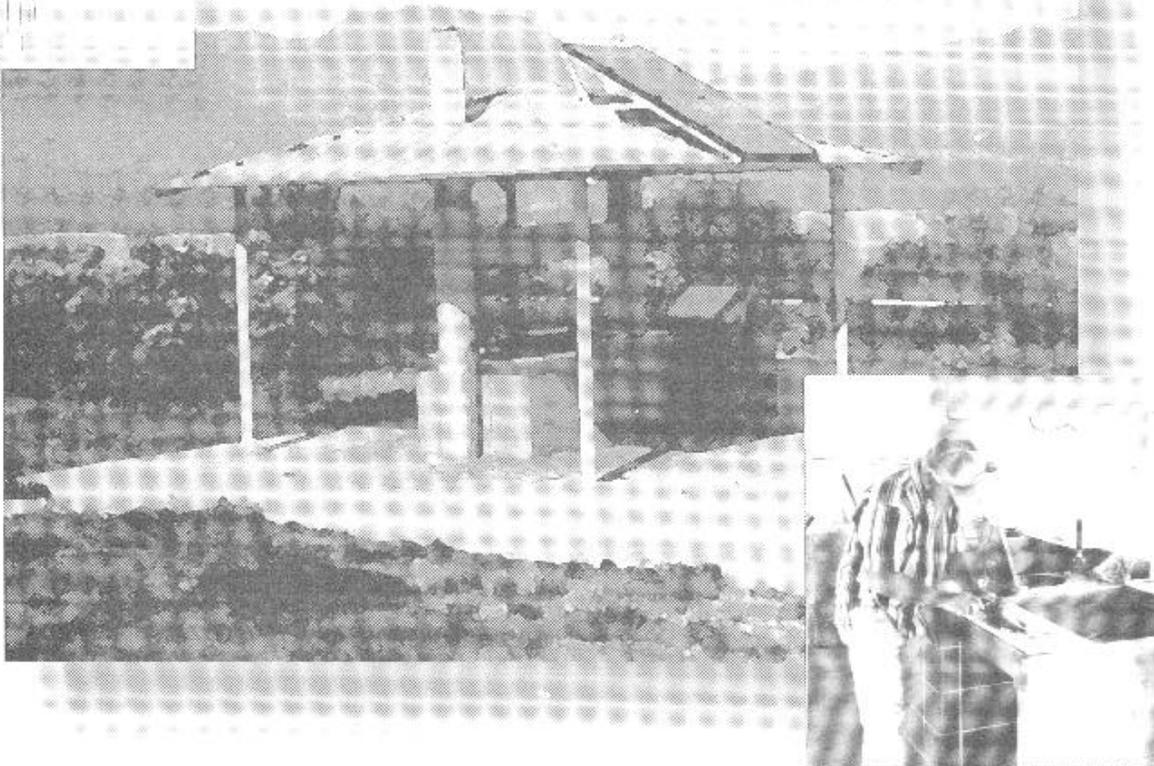
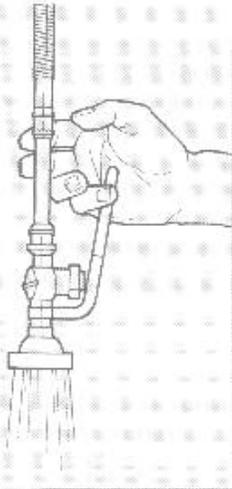
Forest Service

Technology &
Development
Program

2300 Recreation
October 1994
9423 1208—SDTDC



Facilities, Methods, and Equipment for Fish Cleaning and Disposal of Fish Viscera



Facilities, Methods, and Equipment For Fish Cleaning and Disposal of Fish Viscera

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3E21A05
Survey Fish Entrails Disposal Systems

October 1994

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Cover illustration and Figure 18:
Fish cleaning facility at Roosevelt Lake
on the Tonto National Forest of Arizona.
The facility is located convenient to the
parking lot and lake. It is also situated
close to the rest rooms.

ABSTRACT

The scope of this report covers facilities, methods, and equipment in use for fish cleaning and disposal of fish viscera at recreation sites. There is a variety of facilities and equipment in use with a large range in cost. All require daily attention. Facilities include open cleaning areas and fully enclosed buildings. The disposal methods range from wrapping in newspapers and placing in land fills, composting in wood shavings, to high production waste grinders.

This variety of equipment seems to be meeting needs when properly designed, installed, serviced, and maintained. Therefore, there is no need at this time for development of additional equipment, methods, or facilities for the cleaning of fish and the disposal of fish viscera and other fish waste at recreation sites.

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INTRODUCTION

In the past 15 years the use of Federal recreation lands has increased greatly due to more leisure time and money available to the public. Fishing, as an adjunct to camping, has become increasingly popular. Recreation planners realized that for health and aesthetic considerations and customer satisfaction, fish cleaning facilities should be made available to the public.

Fish cleaning facilities, usually located near boat ramps, offer the public a convenient and sanitary area in which to scale, behead, and gut their catch. Providing a central fish cleaning facility allows the fisherman to return to camp or home with a pan-ready fish. Fish cleaning facilities lessen the chance of fish being cleaned in rest rooms, by water spigots, or in other inappropriate places.

A fish cleaning facility requires daily servicing, but it also reduces the maintenance of the campground by keeping fish waste products away from campsites and other use areas. The accompanying smell and fly problems are eliminated from these areas. The smell and fly problem can be controlled or eliminated altogether by a properly operated and maintained fish cleaning facility.

There are three basic types of facilities now in use. The most basic involves wrapping fish waste in newspapers which are then put in trash containers. A second method is to compost the fish waste. This involves a two level arrangement where the first level is generally at ground level with the composting tank below ground. A third method is to grind the heads and viscera fine enough so it can be handled by a sewer system.

FACILITIES

Facilities for cleaning fish and the disposal of the heads and viscera consist of a table or counter, a sink with cold, running, potable water, sometimes a brush for scaling, and a method for disposal of the fish waste products. Facilities can be open air or enclosed, depending on the method used to dispose of the heads and viscera and on the insect problem and weather in the area. Fish cleaning counters with built-in grinders are commercially available.

Some fish cleaning facilities' counters have been designed by forest engineering staff using various methods of waste disposal. Necessary to all fish cleaning facilities are easy to follow posted instructions on the use of the facility and detailed maintenance and cleaning instructions.

All fish cleaning facilities should have cold, running, potable water with automatic shutoffs.

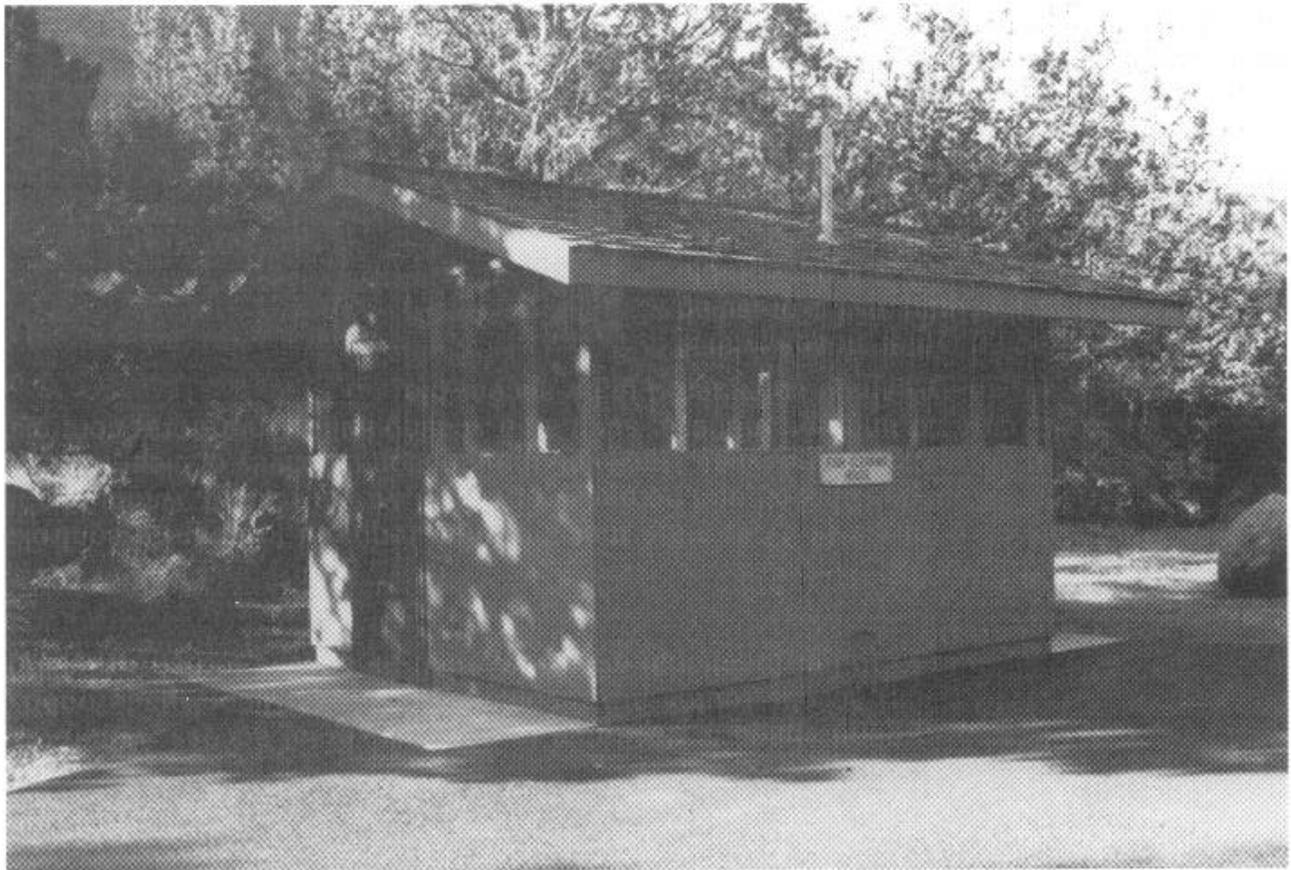


Figure 1.—State of Oregon fish cleaning facility at Lake Billy Chinook Recreation Area using newspapers and garbage cans. Note the building is screened in to keep flies and other insects away from the fish waste.



Figure 2.—Accessible composting fish cleaning facility near Denver, Colorado. Compost fish cleaning facilities can be open or enclosed.



Figure 3.—Fish cleaning facility on the Umpqua National Forest, Diamond Lake Campground, Oregon, which uses grinders for disposal of fish waste. Fish cleaning facilities employing grinders can be open or enclosed. Some are enclosed to protect people from the weather.

ACCESSIBILITY

Although fishing occurs in a wide variety of settings, fish cleaning facilities are generally located at sites where fishing is a primary activity. Fish cleaning facilities should be designed and maintained to meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG). In urban/rural settings there should be at least one fish cleaning facility on an accessible route in close proximity (within 1/8 mile - 0.2 km) to an accessible fishing station or boat access area. In natural areas with roads, fish cleaning facilities should be within 1/4 mile (0.4 km) of an accessible fishing station or boat access area and on an accessible route.

Where fishing is not a primary activity and the fishing stations are located more than 1/4 mile (0.4 km) from the parking area, access to the fish cleaning facility may be designed according to the guidelines for recreation trails.

Buildings

If fish cleaning buildings are provided, the buildings shall meet ADAAG requirements for accessibility. See figure 4 for view of accessible fish cleaning facility.



Figure 4.— Accessible fish cleaning facility at Fools Hollow Campground, Apache-Sitgreaves National Forest of Arizona.

Sinks and Counters

At least one 36-inch (915-mm) section shall comply with ADAAG 4.32 (Fixed or Built-in Seating or Tables). Where a sink is provided, it shall comply with ADAAG 4.24 (Sinks). In both cases the maximum height is 34 inches (865 mm) and the counter must have a minimum knee clearance height of 27 inches (685 mm) high. Knee space at counters shall be a minimum 19 inches (485 mm) deep. Sink's knee and toe space shall comply with figure 5.

Ambulatory persons generally work at fish cleaning tables in a standing position. The ideal height of the counter is about elbow height to avoid back strain. Since this height varies with the height of the person, a single counter height will present difficulty for some persons. Sinks and counters should be designed universally. Designs with several counter heights will best meet the needs of all persons (figure 6).

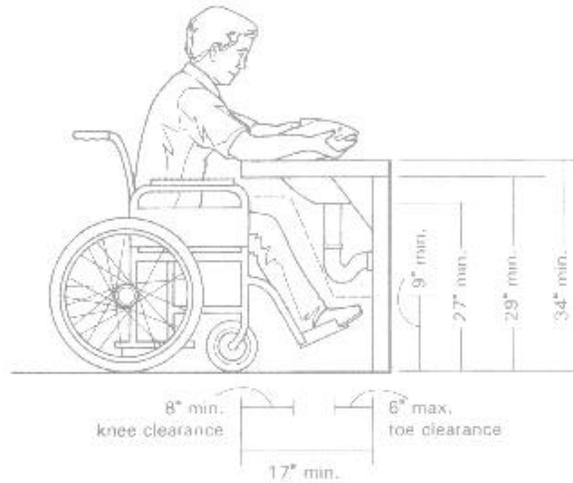
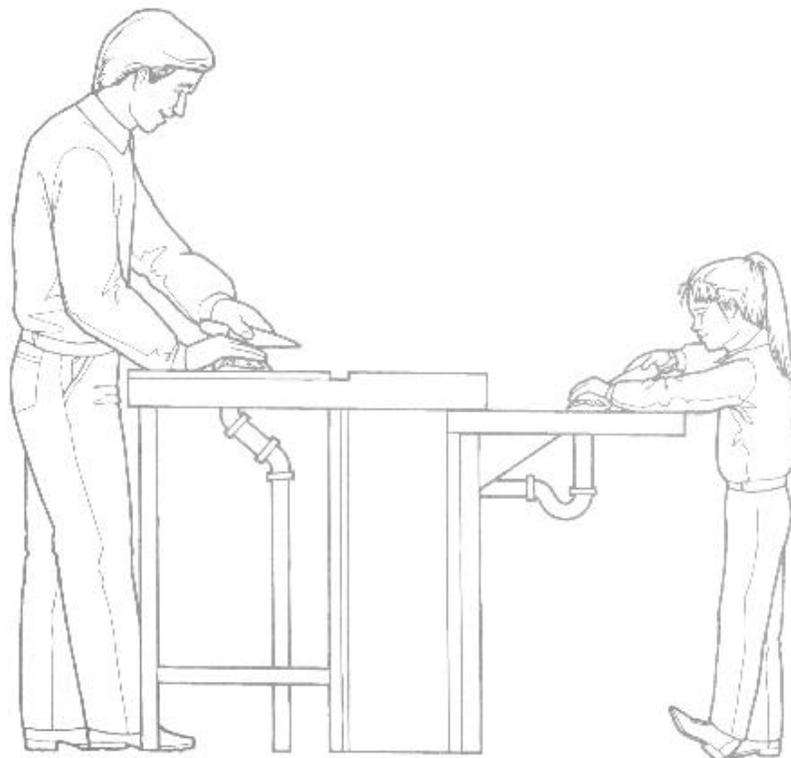


Figure 5.—Accessible sink counters. ▶

Figure 6.—Fish cleaning facility with two counter heights for universal design.



Clear Ground or Floor Space

Fish cleaning facilities shall comply with ADAAG 4.32 (Fixed or Built-in Seating or Tables), ADAAG 4.24.5 (Clear Floor Space for Sinks), and ADAAG 4.3 (Accessible Routes). A clear floor space of 30 by 48 inches (760 by 1220 mm) is required in front of the sink or counter with a maximum of 19 inches (485 mm) underneath the sink or counter. An accessible route of a minimum of 48 inches (1220 mm) wide is required adjacent to the counter.

These minimums will provide adequate clear space for an ambulatory person and a wheelchair user, a person with a service animal or a semi-ambulatory person to pass one another, although the ambulatory person will have to twist to pass. It will also provide adequate clearance for an ambulatory person to pass a wheelchair user working at the counter or sink (see figure 7). The ambulatory person may have to twist to pass.

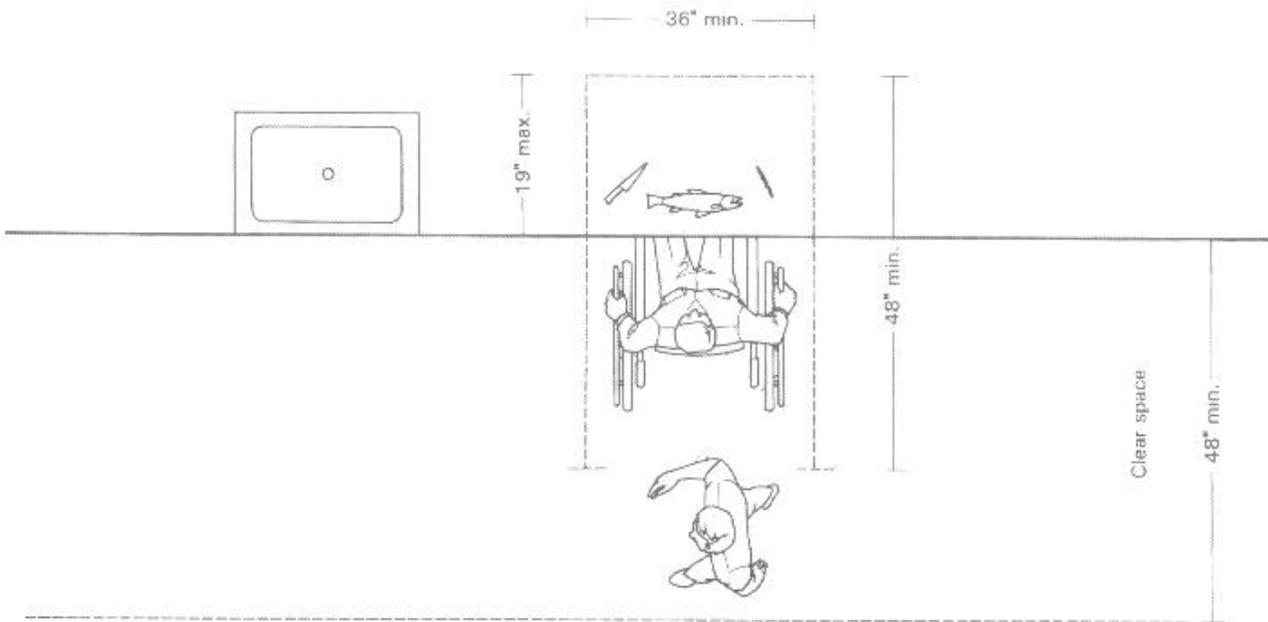


Figure 7.—Clear space passing requirements.

Clear floor space shall be adequate to allow a wheelchair user to turn around to exit the cleaning facility. Incorporating the clear space under the lavatory into a 60 by 60 inch (1525 by 1525 mm) T-shaped space (ADAAG 4.2.3) will meet the minimum requirement (see figure 8). These are minimum dimensions.

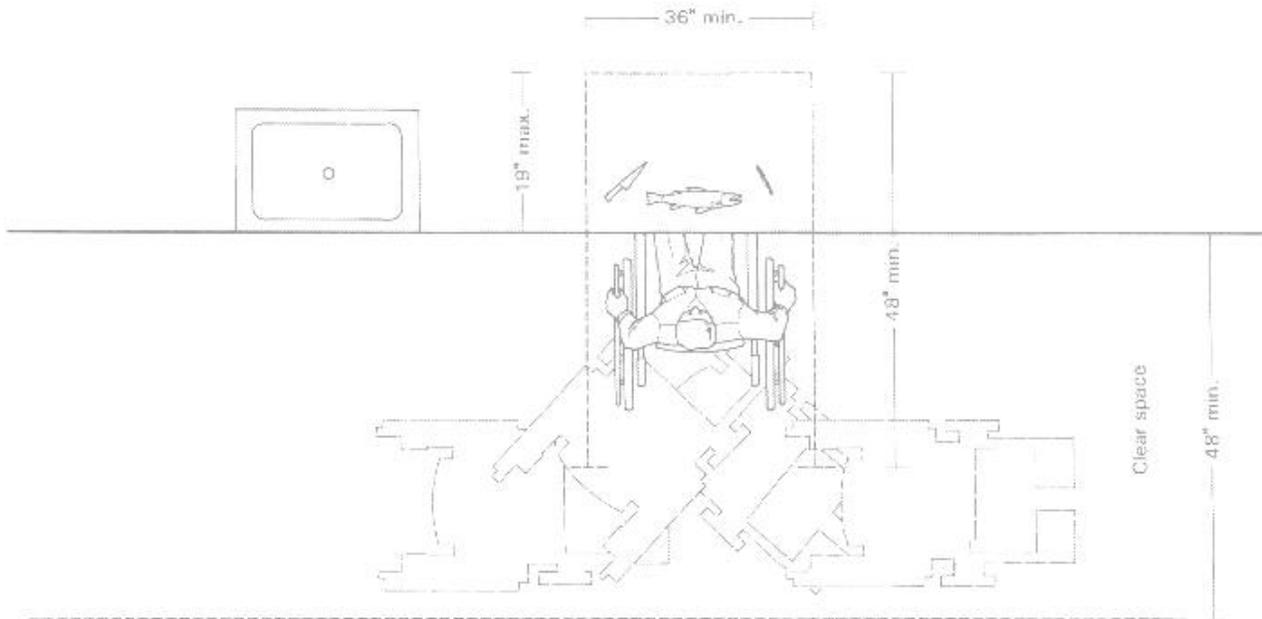


Figure 8.—Clear space requirements.

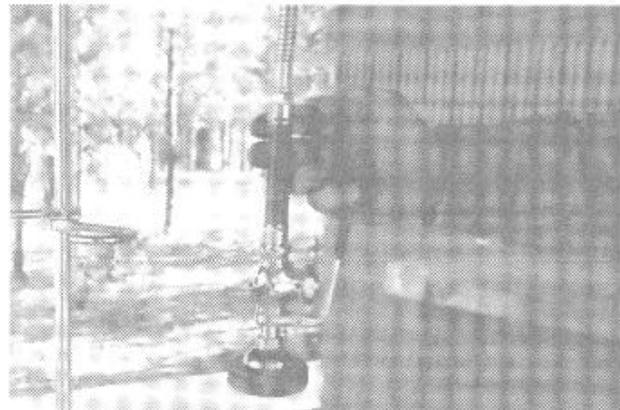
Additional clear floor or ground space is desirable to meet universal access. Wherever feasible, 60-inch (1525-mm) access routes are recommended. Clear floor space needs must also be considered for other functional activities, such as access to fish wrapping papers, garbage cans, etc.

Operating Mechanisms

ADAAG standards on controls (4.27.4) state that the force required to operate controls should not exceed 5 pounds (22.2 N) and be easily operable with one hand, without tight grasping, pinching or twisting of the wrist. However, the functional activity of cleaning fish requires the ability to hold and use utensils, such as a scaling knife. Therefore, controls requiring similar dexterity can be considered to be accessible.

For example, hanging water hoses with a control mechanism that requires the grasping and squeezing of a handle are acceptable as long as the force and dexterity required to operate them does not exceed that which is necessary to use a scaling knife.

Figure 9.—Water controls for fish cleaning facility. Requiring squeezing of a handle is acceptable as long as the force and dexterity required to operate the control does not exceed that which is necessary to use a scaling knife.



Height and Reach Limits

ADAAG 4.27.3 states that maximum reach limits do not apply where use of specialized equipment dictates otherwise. For fish cleaning activities requiring specific actions, such as directing water to wash away entrails or removing newspapers to wrap fish from a counter, functional reach limits have to be considered. For example, we recommend the hanging water hose operating mechanism be placed at a maximum of 20 inches (510 mm) horizontally from the edge of an accessible sink and a maximum of 12 inches (305 mm) vertically above the sink to provide reasonable access (see figure 10).

Exposed Surfaces

Sinks, grinders, counters, etc., should be free of sharp edges.

Signing

If all fish cleaning facilities are fully accessible there is no need to sign the facilities with the international symbol for accessibility. If only some of the fish cleaning facilities are accessible, the accessible facilities must be designated and ADAAG 4.30 requirements met.

Characters and numbers on information signs must be sized according to the viewing distance from which they are to be read. Signs mounted overhead should have letters at least 3-inches (76-mm) high. Sans serif lettering is preferred. Width to height ratio for all characters should be between 3:5 and 1:1 and a stroke-width-to-height ratio of between 1:5 and 1:10. Colors for text and background should sharply contrast and have a non-glare finish.

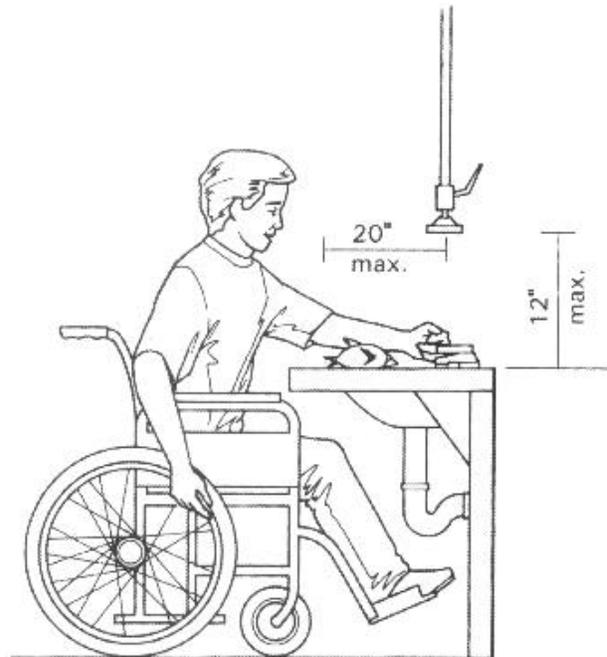


Figure 10.—Recommended height and reach limits for water hose.

DISPOSAL METHODS

Disposal methods of the viscera include wrapping in newspaper and placing in garbage cans and hauling to a land fill; composting in wood shavings and disposal in accordance with local regulations; and using grinders to grind and crush the viscera and other fish waste which is then processed by a sewer system.

Newspapers and Container

A low technology approach to the fish cleaning and disposal of the fish waste problem is to provide a counter, running water, and a storage bin with at least a one day supply of newspaper and garbage cans. With this method a screened-in enclosure is necessary along with daily cleaning, restocking of newspapers, and removal of the newspaper wrapped fish waste to a land fill. This method has a low initial cost and with little to go wrong if serviced daily. If serviced daily about the only thing that can go wrong is a plugged drain. The state of Oregon, at Lake Billy Chinook Recreation Area, has installed special drain traps made from a flat metal box with a fully opening lid in their fish cleaning facilities. This makes cleaning out the drain very easy.

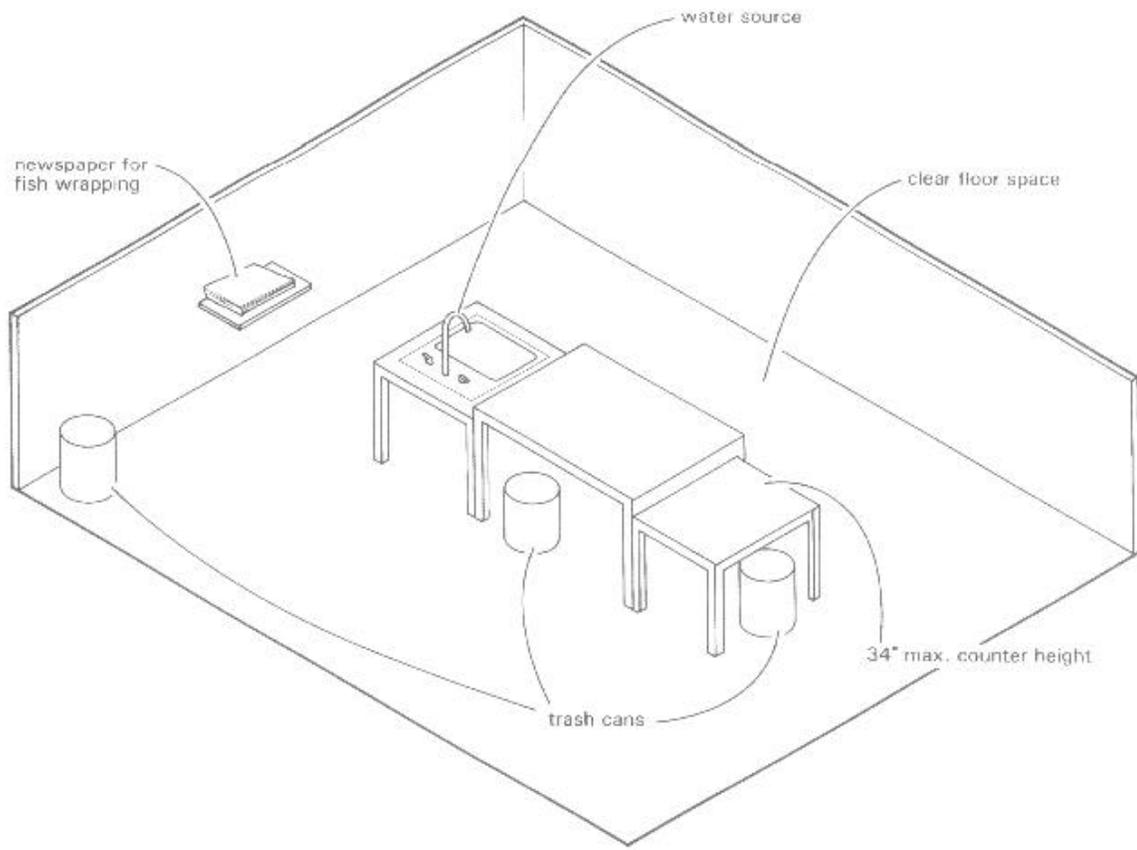


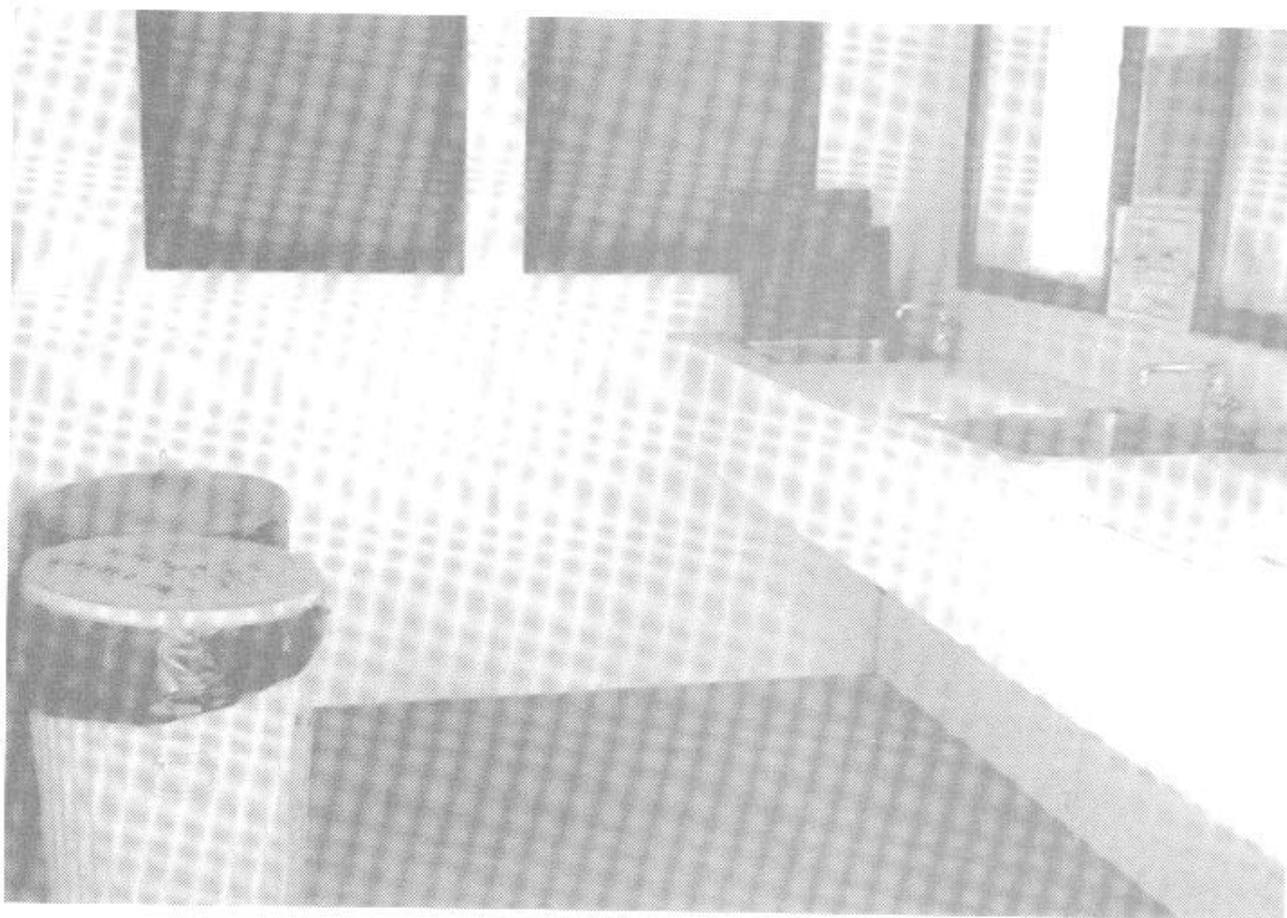
Figure 11.—Universal design layout of fish cleaning facility.



Figure 12.—Screened-in fish cleaning facility, located at the Rock Creek Campground of the Deschutes National Forest, Oregon, uses the newspaper and container method for disposal of fish viscera.

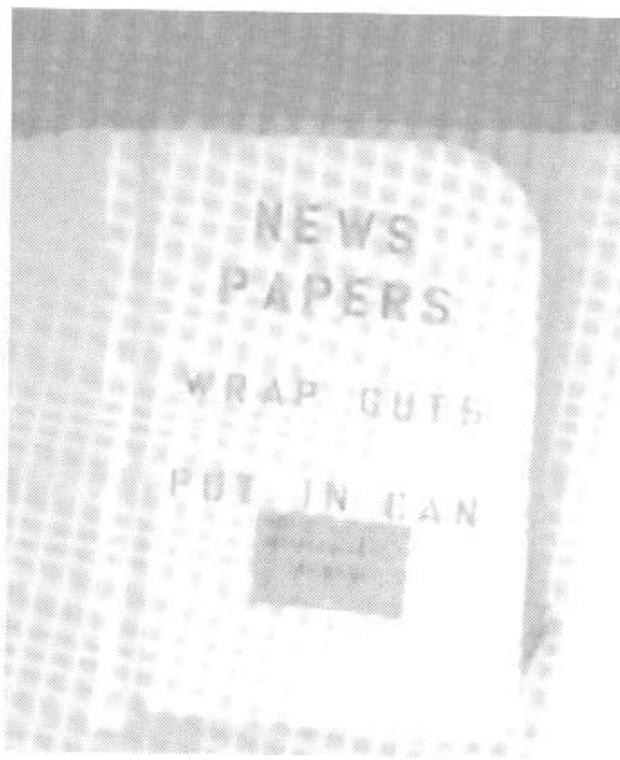


Figure 13.—These facilities have cold, running, potable water. Potable water is supplied by a hand-pumped well next to the fish cleaning facility.



▲

Figure 14.—Counter for cleaning fish and sink with running water inside screened-in fish cleaning facility. Note garbage cans in which to place newspaper wrapped fish waste. Proper signs and easy to understand instructions should be easily visible. Care needs to be taken that water faucet controls, counter tops, newspapers, and garbage cans are functionally accessible. This facility was not designed for universal access.



►

Figure 15.—Bin for storing old newspapers for use in wrapping fish viscera.

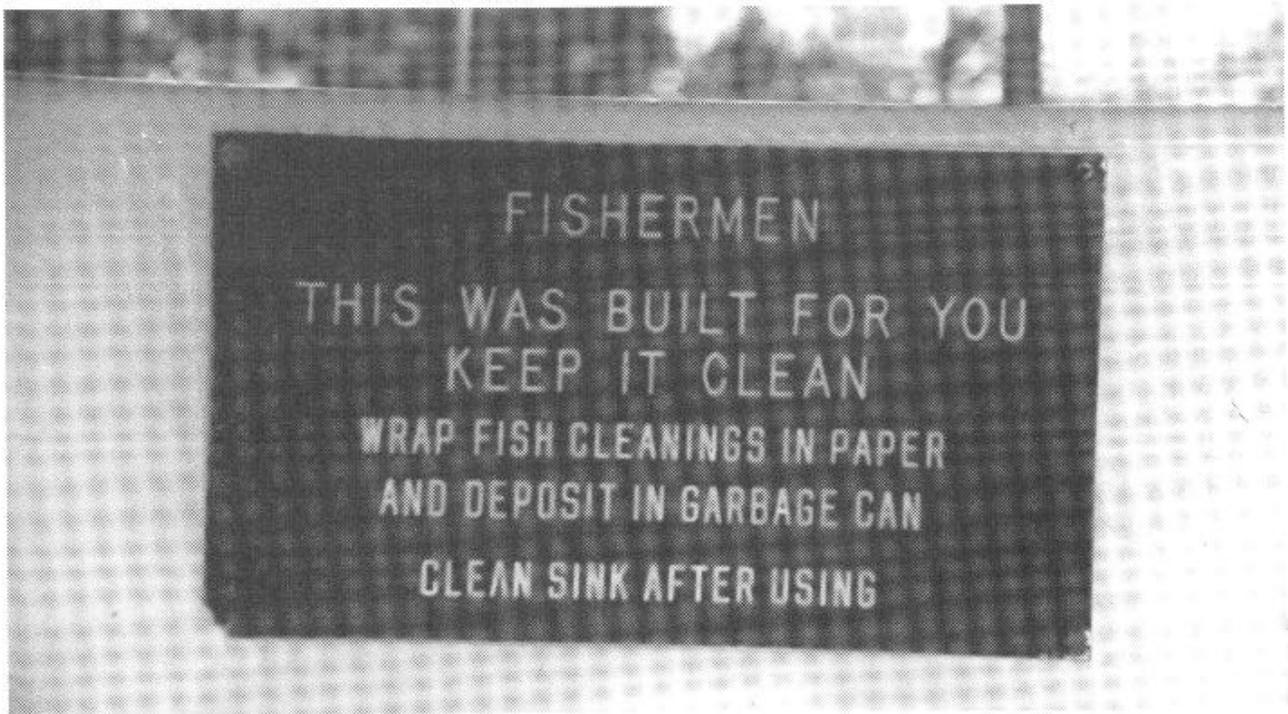


Figure 16.—Sign giving instructions on use of fish cleaning facility.

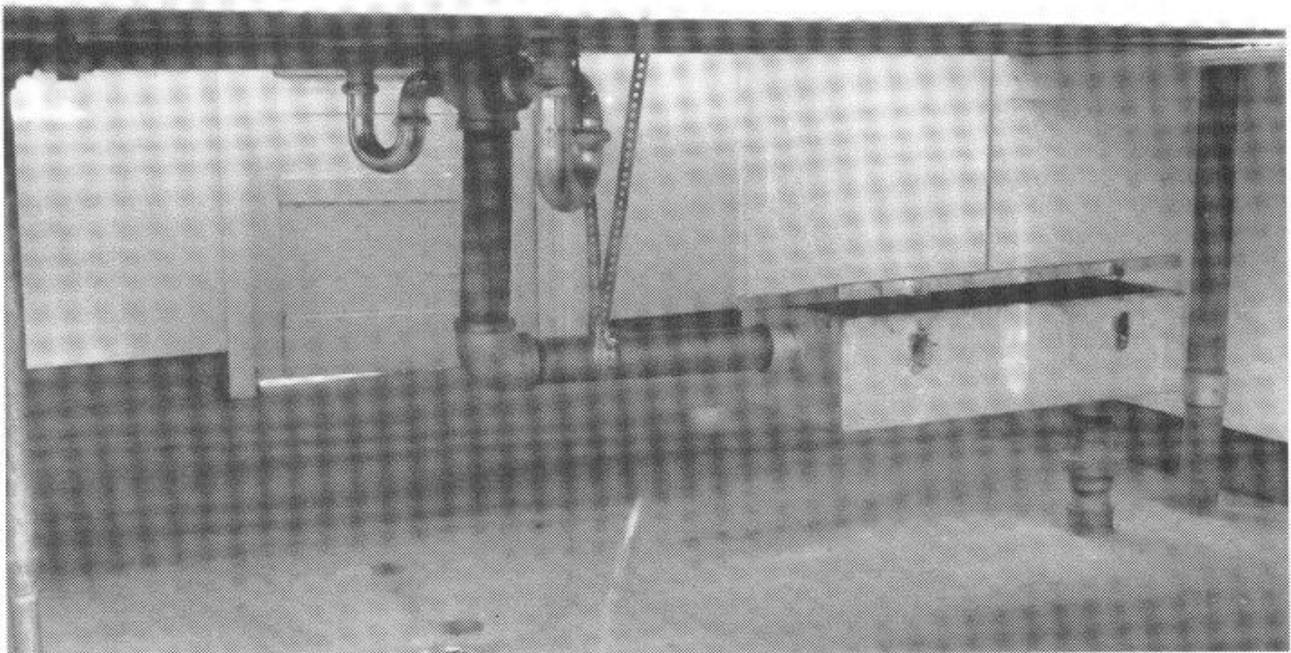


Figure 17.—Special, easy to clean drain trap in use at the Oregon state Lake Billy Chinook Recreation Area.

Composting

Although composting is not new, using a composting digester to handle fish waste is a new application of the technology. Waste fish products drop through a hole (generally six to eight inches in diameter) to a lower level composting tank with a bed of wood shavings. A fan circulates air through the compost bed to promote aerobic bacterial action and to help in evaporation of water. Excess liquid is drained or pumped to a leach field or sewer system.

Composting fish cleaning facilities generally do not require enclosures. A basement or retaining wall is needed for most digester tanks. Composting fish facilities need cold, running, potable water to wash the fish. They also require AC or DC electricity to power the fans and may require electric power to pump waste water out of the digester tank. DC electricity can be supplied with photo-voltaic panels or a thermo-electric generator. AC electricity can be supplied from a power line. Grinders or masticators are not required.

Wood shavings or other bulking agent must be added and the compost bed must be stirred several times a week to allow air into the pile. Nonorganic material must be removed from the compost bed before adding shavings and stirring. It only takes about 5 or 10 minutes to stir the bed. If the bed is not stirred frequently, the digester will become anaerobic and overpowering odor will result.

It is very unpleasant to deal with a tank that has been allowed to become anaerobic. Composted material may need to be removed once a year depending on the amount of use.



Figure 18.—Fish cleaning facilities near Roosevelt Lake on the Tonto National Forest, Arizona. Facility uses composting to dispose of fish waste.

Care should be taken when removing the composted material since sharp objects, such as fish hooks, may be present. The composted material can be taken to a land fill or used as a soil amendment, depending on local regulation. Contact your local regulating agency before using the compost as a soil amendment. EPA is currently writing regulations concerning the use and disposal of composted materials.

The composting method of disposing of fish waste at a fish cleaning facility uses considerable more water than is common for a composting unit.

Because of the increased water use, extra care needs to be taken in the design of the system, particularly in wetter climates where evaporation is poor. Excess water must be removed from the digester tank to prevent the tank from becoming anaerobic. It may be removed by gravity drain, hand pump, or electric powered pump. The liquid may be disposed of in a leach field or sewer system. Some states allow grey water reuse for subsurface irrigation. Composting fish cleaning facilities are most appropriate in locations without grid electric power and sewer systems. They have a high initial cost and high maintenance cost.



Figure 19.—Fish cleaning facilities in use at Roosevelt Lake, Arizona.

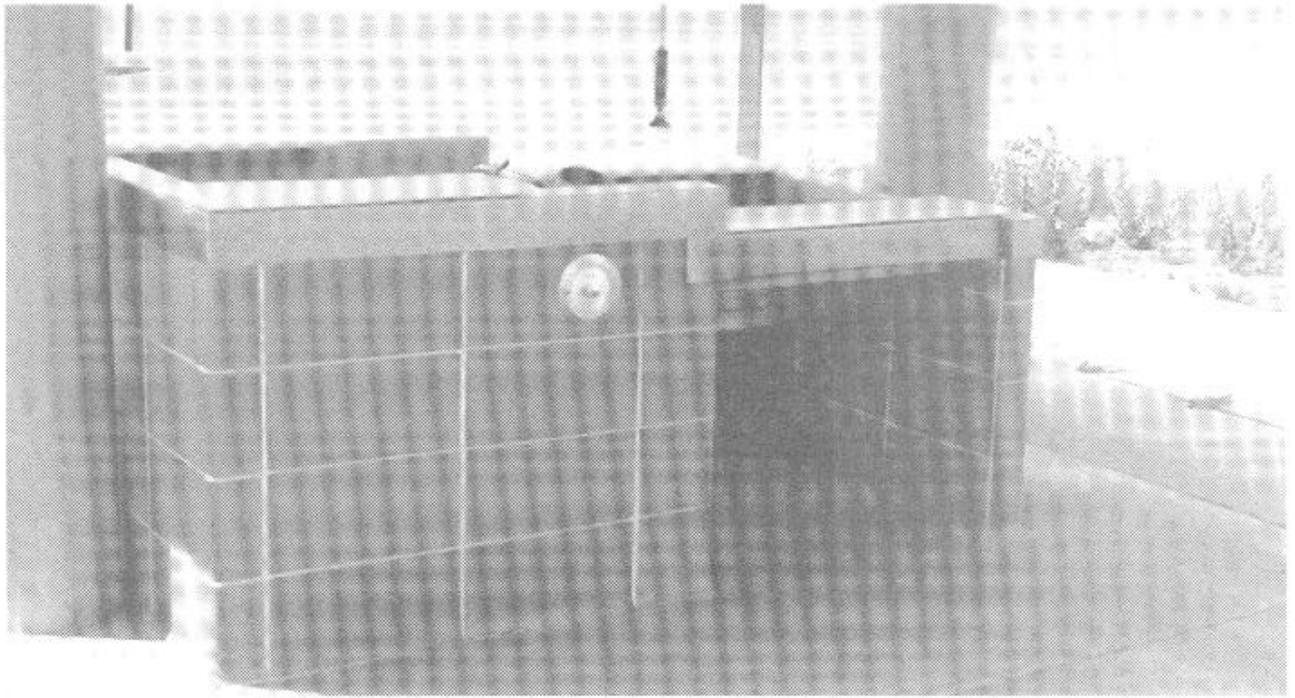


Figure 20—Close up of composting fish cleaning facility showing universal access at Roosevelt Lake.

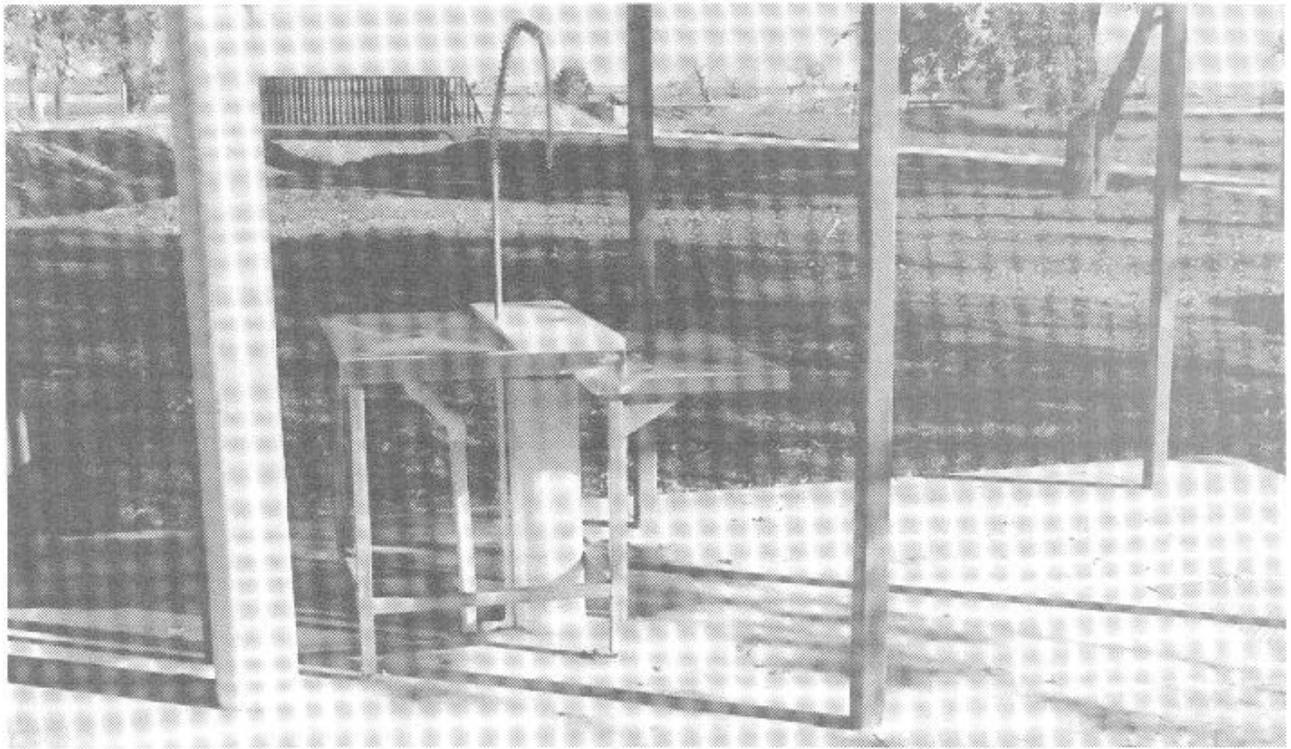


Figure 21.—Composting fish cleaning facility near Denver, Colorado.



Figure 22.—View inside of digester tank showing the debris pile and wood shavings. This digester tank must be stirred several times a week. Nonorganic waste, such as the plastic bag shown, must be removed or the composting unit will not function properly.

Masticating

A third method of disposing of fish waste is the use of a heavy-duty garbage disposal unit below the sink. The ground up waste then goes into a sewer system. This method must have a sewer system, to dispose of the ground up fish waste, which can be a sewer line or a septic tank and leach field. This method generally does not need an enclosure as the waste is removed from the area rapidly.

Cold, running, potable water is required as well as electricity and a sewer line or septic system. Because grinders and masticators may require considerably more electric power than can be economically furnished by solar panels, it cannot be located where an electric grid power line is not available. There is also a possibility of a jam of the grinding mechanism and, therefore, the mechanism needs to be checked frequently (daily or more often).

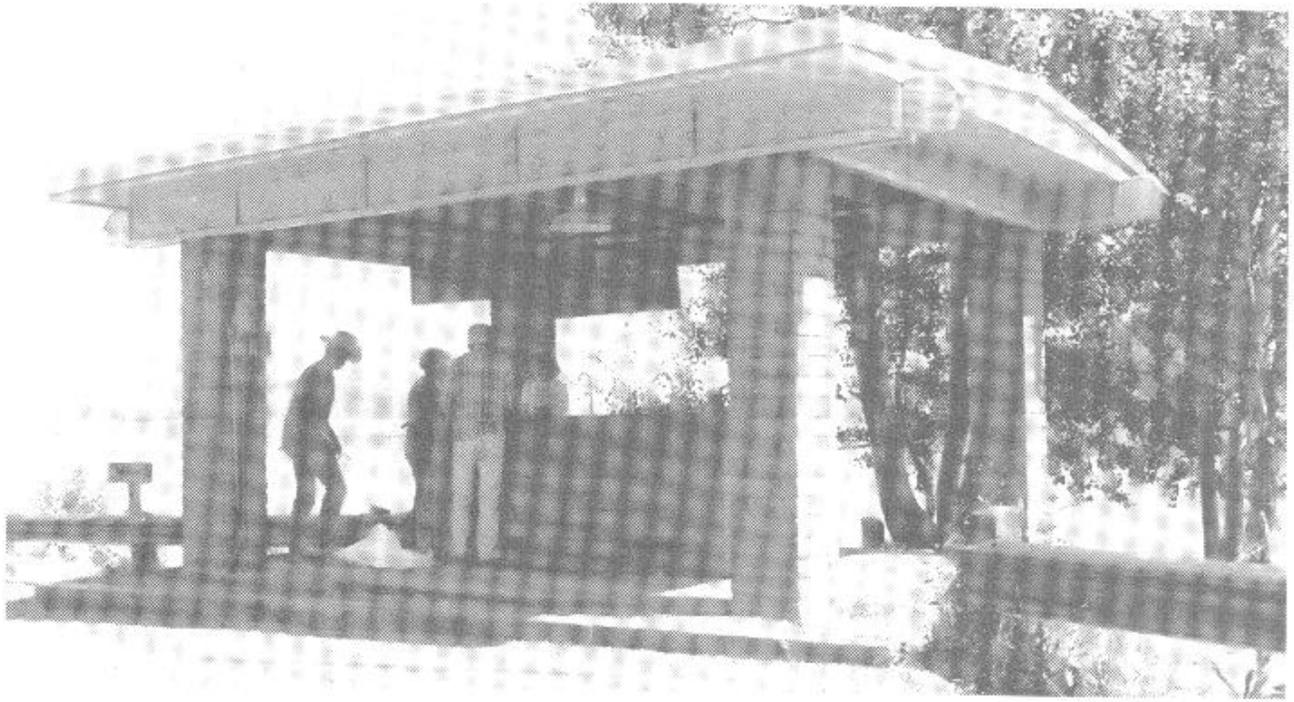


Figure 23—Open air masticating fish cleaning facility on Big Lake, Apache-Sitgreaves National Forest of Arizona.

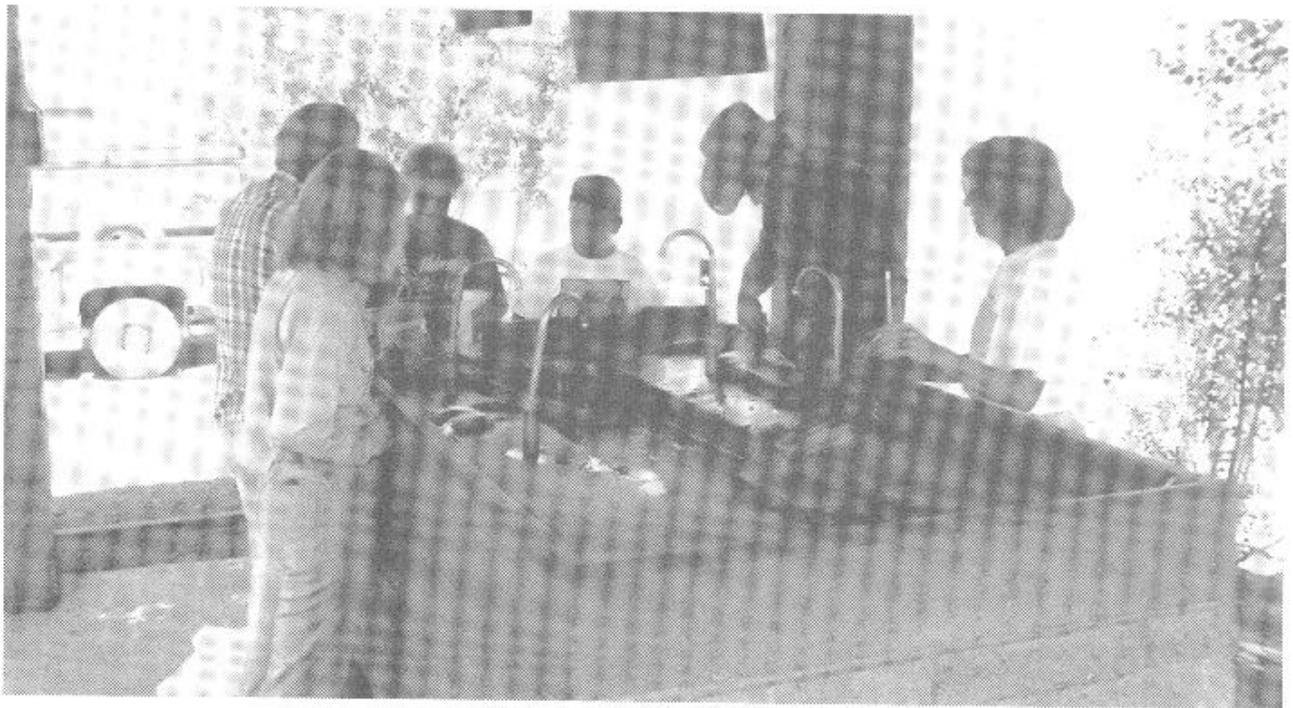


Figure 24.—Fish cleaning surface of the counter at Big Lake which has been in operation for almost twenty years. This facility lacks universal access.



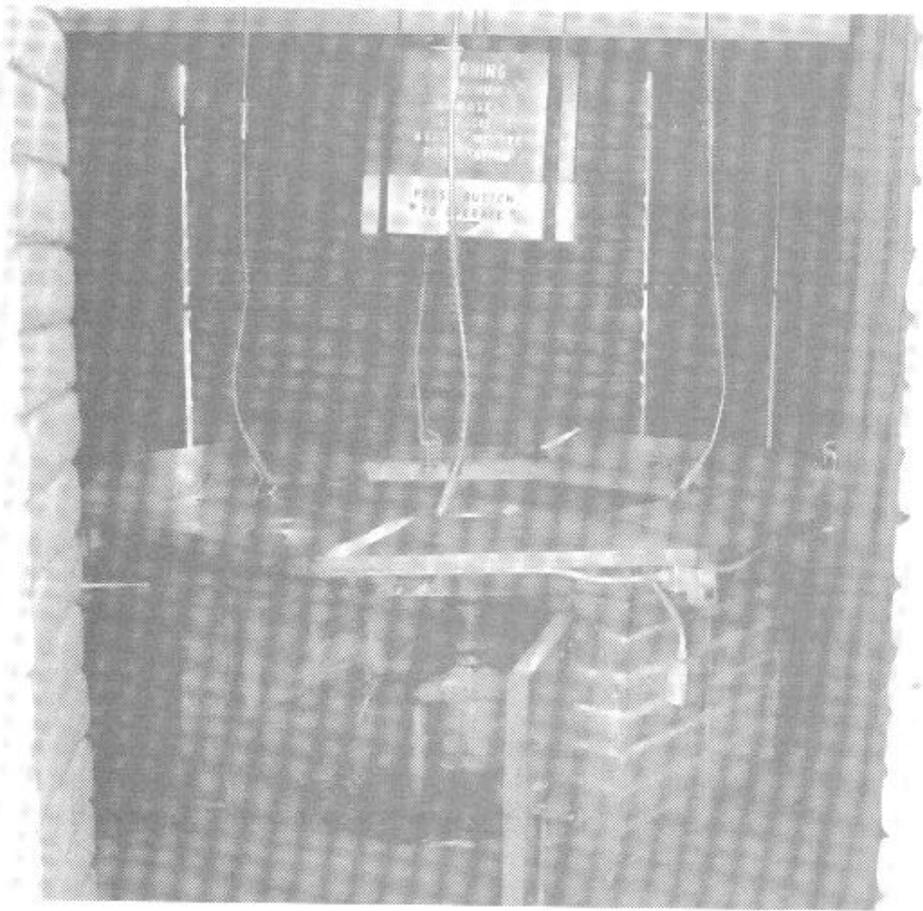
Figure 25—Fish cleaning facilities should have clear and easy to follow directions.



Figure 26—Directions for operating the equipment should be clear and direct..



Figure 27.—Enclosed fish cleaning facility at McPhee Reservoir on the San Juan National Forest of Colorado which uses a grinder to help dispose of fish waste.



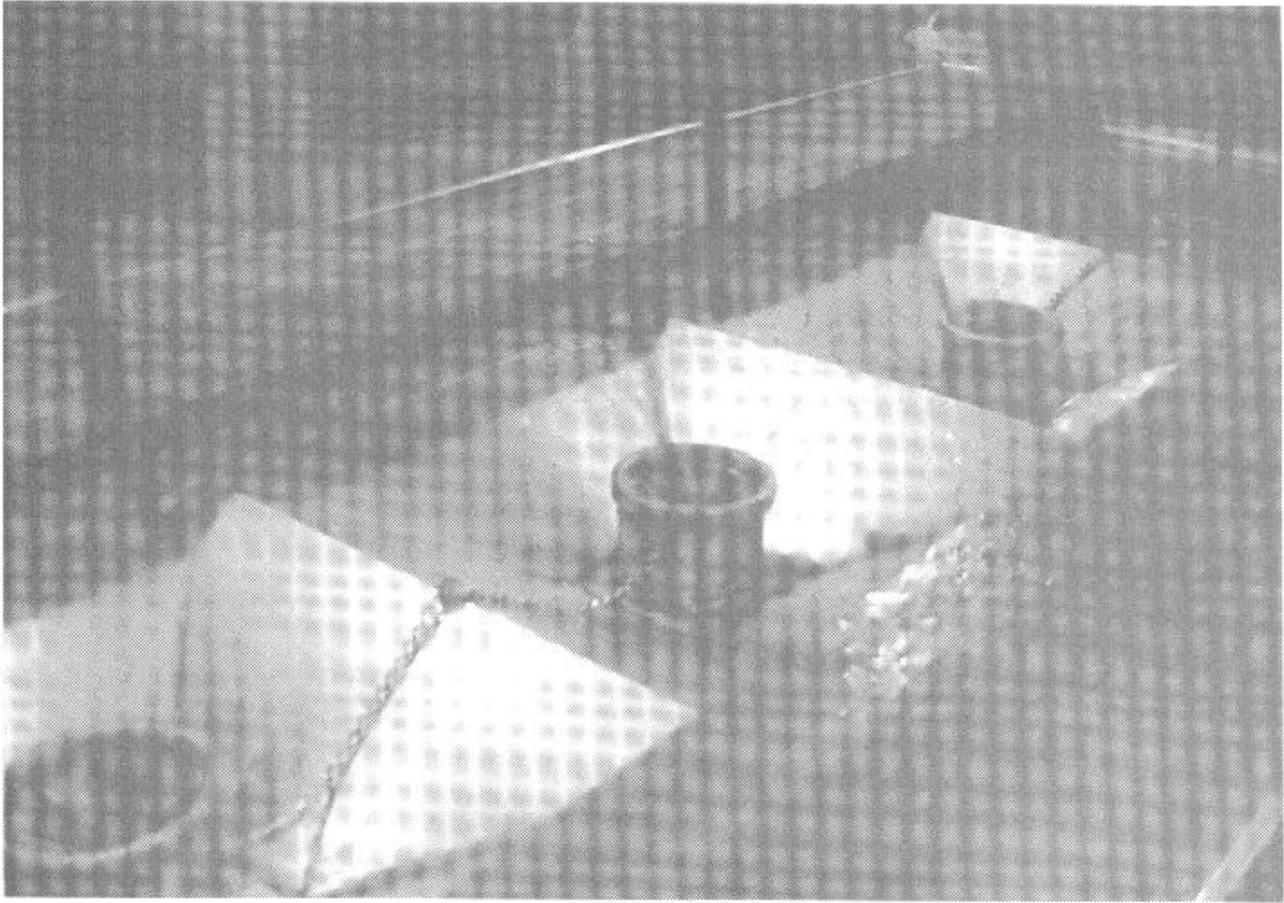
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Figure 28.—Fish cleaning counter at the McPhee Reservoir facility. This facility was not designed for universal access.



Figure 29.—Large five-horsepower grinder used to masticate fish waste before treatment by the sewer system.



Figure 30.—Warning and operating instructions on a fish cleaning facility.



*Figure 31.—Garbage disposal units at the Diamond Lake Campground,
Umpqua National Forest, Oregon.*

SELECTION OF FISH CLEANING FACILITY TYPE

Fish cleaning facilities have to be fit to the recreation site both in location and type. The table on page 22 may be helpful in the selection of the type of fish cleaning facility needed.

Table 1.—*Fish Cleaning Facility Selection Data.*

	Newspaper and Container	Composting	Masticating
Cost	Low	High	Medium*
Amount of cold, running, potable water	Low-Medium	Medium	High
Sewage treatment necessary	No	No	Yes
Amount of grey water requiring treatment	Medium	Medium	Not applicable
Leach field can be used	Yes	Yes	With sewage treatment only
Electricity	Not required	Power line or Solar	Power line
Daily maintenance	Clean, remove waste, & stock newspapers	Clean, add shavings & stir as necessary	Clean and check operation of grinders
ROS** urban/rural	possible	possible	norm
ROS roaded natural	norm	norm	norm
ROS semi-primitive	norm	possible	inconsistent
ROS primitive	inconsistent	inconsistent	inconsistent
*Assumes power and sewer are readily available			
** ROS - Recreational Opportunity Spectrum			

SUMMARY AND RECOMMENDATIONS

There is a variety of facilities, equipment, and methods operational at heavily used recreation sites to clean fish and dispose of fish viscera and other fish waste. All require daily attention. Facilities range from wrapping in newspapers, placing in trash containers, and then removing to a land fill; composting using wood shavings; to the use of high production waste grinders.

This variety of equipment and methods seems to be meeting needs when properly designed, installed, serviced, and maintained. Therefore, there is no need at this time for development of additional equipment, methods, or facilities for the cleaning of fish and the disposal of fish viscera and other fish waste at recreation sites.

SUPPLIERS AND EQUIPMENT SOURCES

Fish Cleaning Tables and Counters

American Delphi, Inc.
7110 Fenwick Lane
P. O. Box 307
Westminster, CA 92683
(714) 894-0515
(800) 854-6464

American Delphi manufactures fish and game cleaning tables complete with water plumbing and installed wiring. They are universal accessible.

Biological Mediation Systems, Inc.
P. O. Box 8248
Fort Collins, CO 80526
(303) 221-5949

Biological Mediation Systems manufactures fish cleaning tables which can be used with their composting units.

GARB-EL Products Company
240 Michigan St.
Lockport, NY 14094
(716) 434-6010

GARB-EL Products Company manufactures a stainless steel fish cleaning table and the disposer unit.

Knouff & Knouff, Inc.
P. O. Box 9912
Spokane, WA 99209-0812
(509) 467-3303

Knouff & Knouff have a fish cleaning counter with stainless steel sink, polyethylene cutting boards, overhead support of water lines with built-in garbage disposer with timers.

Grinders and Masticators

American Delphi, Inc.
7110 Fenwick Lane
P. O. Box 307
Westminster, CA 92683
(714) 894-0515
(800) 854-6464

Anaheim Manufacturing
Waste King Disposal
4240 E. La Palma Ave.
Anaheim, CA 92807
(714) 524-7770
(800) 854-3229

Franklin Miller, Inc.
60 Okner Parkway
Livingston, NJ 07039
(201) 535-9200

Franklin Miller manufactures a line of sewage shredders.

GARB-EL Products Company
240 Michigan St.
Lockport, NY 14094
(716) 434-6010

In-Sink-Erator
Division of Emerson Electric Co.
4700 21st St.
Racine, WI 53406
(414) 554-5432
(800) 558-5700

JWC Environmental
16802 Aston St., Suite 200
Irvine, CA 92714
(714) 833-3888

JWC Environmental manufactures the Muffin Monster, a very powerful sewage masticator.