



M e m o r a n d u m
Oregon Department of Fish and Wildlife

Date: November 15, 2013

To: Chief, Operations Division
Portland District
U.S. Army Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946

From: Robin Brown, Oregon Department of Fish and Wildlife
Steven Jeffries, Washington Department of Fish and Wildlife

Subject: Research Packet – Project Impacts Document

Enclosed is our request to conduct sea lion capture, marking, tracking, hazing, and removal operations in the Boat Restricted Zone at Bonneville Dam in 2014.

The work we are proposing for 2014 has not changed significantly from that conducted in recent years. Our Bonneville Project contact for this work is Ben Hausmann. Please contact Ben or myself if you have questions or need additional information on our work. Thank you for your assistance.

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RESEARCH PACKET – PROJECT IMPACTS DOCUMENT

**CAPTURE, MARKING, TRACKING, HAZING AND REMOVAL OF SEA LIONS
TO REDUCE PREDATION ON SALMONIDS
IN THE BONNEVILLE PROJECT BOAT RESTRICTED ZONE
IN 2014**

Oregon Department of Fish and Wildlife
Washington Department of Fish and Wildlife
Columbia River Intertribal Fish Commission
Pacific States Marine Fisheries Commission
National Marine Fisheries Service

November 15, 2013

CAPTURE, MARKING, TRACKING, HAZING AND REMOVAL OF SEA LIONS
TO REDUCE PREDATION ON SALMONIDS
IN THE BONNEVILLE PROJECT BOAT RESTRICTED ZONE
IN 2014

BACKGROUND

Over the past decade, staff of the Army Corps of Engineers (USACE) Fisheries Field Unit at Bonneville Dam have documented California sea lions (CSL) and Steller sea lions (SSL) preying on salmonids and sturgeon in the tailrace Boat Restricted Zone (BRZ). In general, the CSL have targeted primarily salmonids while the SSL have taken primarily white sturgeon. USACE observations have shown that many of the sea lions seen in the BRZ each year are identifiable individuals, many of which have returned year after year to repeatedly forage in and around the BRZ. The abundance of both species of sea lions, the amount of time they occur in the BRZ each winter and spring, and the numbers of salmonids and sturgeon consumed increased significantly from 2002 through 2010. In general, the numbers of CSL has decreased since 2010, while the number of SSL has continued to increase. As a result, 2012 was the first year that the number of sturgeon consumed exceeded the number of salmonids taken. In addition, the numbers of salmonids taken by SSL has greatly increased since 2007. In 2013 the number of salmonids taken by CSL and SSL were approximately equal with the total being up slightly over the previous year. Sturgeon predation in 2013 was exclusively by SSL and was down substantially from recent years.

Concern over this relatively new source of mortality of adult salmonids occurring over the past decade, particularly those listed as threatened or endangered under the Endangered Species Act, has been expressed by resource managers at USACE, Bonneville Power Administration, National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), Idaho Department of Fish and Game, and Columbia River Intertribal Fish Commission (CRITFC) among others. A brief history of the project is provided on a year by year basis in an appendix. The purpose of the following information is to describe the pinniped research activities to be conducted in and around the BRZ in 2014 by ODFW, WDFW, CRITFC, PSMFC, and NMFS.

OBJECTIVES

- 1) Capture and permanently remove individual predatory CSL from the Bonneville Dam area as permitted under the NMFS Section 120 Authority granted to the States.
- 2) Increase the proportion of marked CSL and SSL found in the Bonneville Dam area.
- 3) Improve our understanding of salmonid predation levels below Bonneville Dam.

- 4) Increase our food habits and prey genetics database.
- 5) Minimize predation and limit the recruitment of new pinniped predators to the area below Bonneville Dam by use of non-lethal hazing activities.

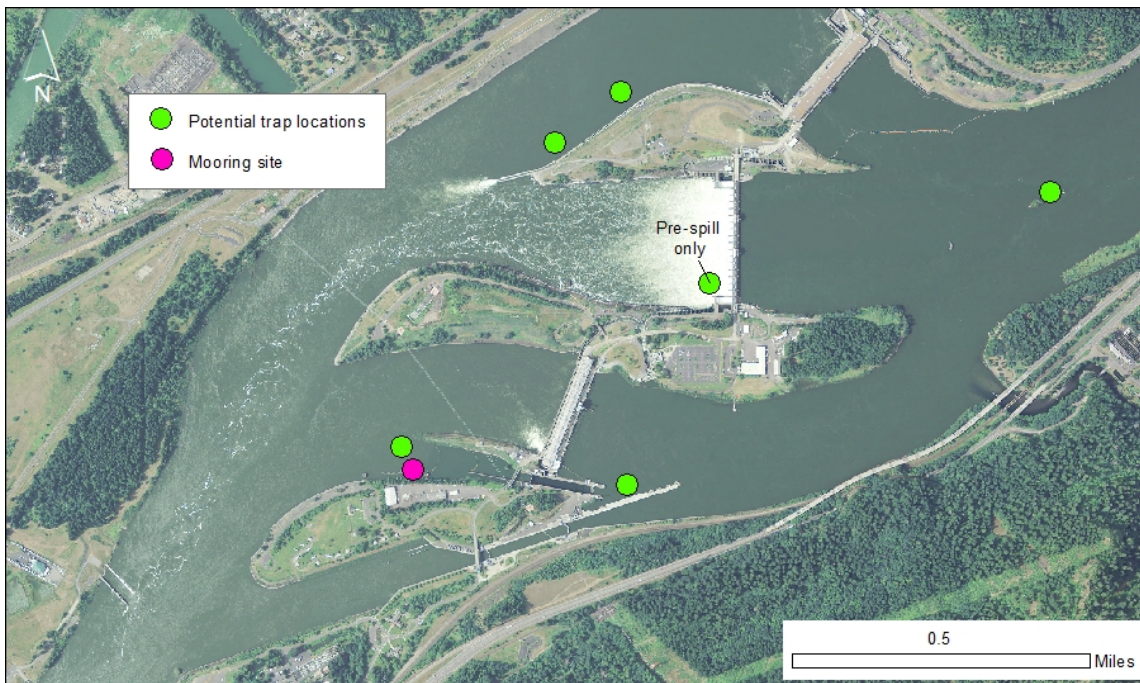
METHODS

Objectives 1 and 2. Capture and permanently mark as many CSL and SSL found in the BRZ as possible during March, April and May. Knowing CSL as individual salmonid predators is prerequisite to lethally removing them under Section 120 of the MMPA. In addition, increasing the number of permanently marked CSL and SSL found in the Bonneville area will aid in predation observations, estimation of sea lion abundance, and evaluation of salmonid losses. The ability to capture CSL at Bonneville Dam is essential to the States' request to NMFS for lethal removal authority. Capture and transfer to permanent holding facilities will be the first option for removal of individual CSL predators. When permanent captivity options are not available, predatory CSL will be captured and chemically euthanized. Finally, selective use of gunshot, as allowed under the MMPA Section 120 removal authority and as approved in consultation with USACE Bonneville Project staff and other agencies involved, may be used when capture options for individual predators are not effective.

In early March 2014, prior to the arrival of most CSL at Bonneville Dam we will place the floating sea lion traps (three currently moored below the old navigation lock and one temporarily moored just east of the upriver end of Bradford Island) in areas where CSL and SSL are typically found resting in the water or hauled out on structures. SSL may begin using the traps below the old navigation lock at any time, but we do not intend to begin active trapping operations until late March. Placement of additional traps and movement of traps to increase opportunities for sea lion captures may take place at any time during the year. Traps may be located above the dam in the forebay area, in the area immediately below the spillway (prior to spill operations), below the old navigation lock near PH1, and along the Corner Collector wall below PH2 (see figure below). Traps will be temporarily anchored to the bottom during capture operations and may be removed to moorings below the old navigation lock at the end of the spring season. One or more traps may be redeployed in the fall of 2014 if CSL are observed preying on fall migrating salmonids.

In 2010 and 2011 we tested the placement of approximately 500 concrete pier blocks on the corner collector apron near the traps to limit its use by sea lions as a haul-out area. Although the water levels in 2010 were generally lower than in previous years, it appeared that these blocks had some effect at limiting the use of the corner collector apron as a haul-out area. These blocks were cabled together to prevent loss and we did not observe any effect on fish in the area. In 2011 and 2012 unusually high water levels largely rendered this area unusable as a resting area for sea lions. In 2014 we plan to leave the blocks in place in an effort to increase use of our traps as a resting area, rather than the apron.

As was done in previous years, once trapping efforts begin in late March, the traps will be monitored regularly day and night by our project staff and by USACE, USDA, Bonneville security, and Park Ranger staff. CSLs that have been identified for removal under the States' authorization from NMFS will be transferred to permanent holding facilities (if available) or euthanized using drugs. Options for use of firearms to remove predatory CSLs will be considered in consultation with all parties and according to guidelines developed jointly with USACE and law enforcement. Unknown animals that are captured will be marked and may be tagged for tracking purposes. While some newly marked sea lions may be relocated to other locations during the study period, most as yet unidentified predatory sea lions will be released on-site. Any marked CSLs later observed preying on salmonids will be identified as candidates for removal under the State's MMPA Section 120 authority.



We will use our outboard-powered sea lion handling barge with a platform scale, cages and equipment for handling and marking sea lions in the BRZ. This barge, along with our other vessels, will be used to expedite the removal of captured CSLs. As in previous years, we will occasionally require the assistance of the USACE rigging crew for animal removal from water to land or for removal of equipment from the water for maintenance operations on land. At the end of the season, the barge and traps would be moved to the mooring site below the old navigation lock (see figure above).

As in previous years, we will require access to and use of the large metal building on the north side of the spillway to handle captured animals. We have trained forklift operators and will request the occasional use of a forklift to move animals and cages between trucks, trailers and the building at the spillway.

Objective 3. Apply telemetry tracking devices to a sub-sample of the CSL and SSL captured at Bonneville Dam to track movements and describe foraging behaviors near the dam and in the lower Columbia River.

We may deploy various instruments as appropriate to sea lions captured in the spring of 2014. Monitoring of sea lion activities, in conjunction with USACE predation observations and non-lethal hazing efforts would continue through May of 2014. Data on individual animal activity patterns, movements, and foraging behaviors within the study area will be recorded and analyzed. Tracking of sea lions at Bonneville Dam will provide information on movements at night related to foraging and will allow an evaluation of the percentage of time that individual predators feed in areas that can be observed by USACE staff versus foraging behaviors that occur in other areas.

Objective 4. Collect scats (fecal samples) from all areas where sea lions haul out within the BRZ for food habits analysis and genetic identification of salmonid stocks consumed.

As was done in previous years, we plan to collect sea lion fecal samples as frequently as possible during 2014. These collections will be accomplished primarily from boats, but may also include shore-accessed areas in coordination with USACE staff. Individual samples will be bagged, labeled and frozen for analysis. Sea lion prey identification will be conducted by ODFW and WDFW staff and genetic analyses will be conducted by CRITFC staff. Any coded wire fish tags recovered will be reported to the appropriate parties.

Objective 5. Assist with non-lethal hazing activities to be conducted by USACE-USDA (on shore). Conduct limited non-lethal hazing (shore and boat-based) in conjunction with trapping operations and lethal removal.

Boat-based non-lethal hazing efforts to deter pinnipeds from foraging in the BRZ have not been highly successful in the past. In consultation with USACE, NMFS and the Pinniped Task Force, we expect to further reduce boat-based hazing in the BRZ in 2014. However some level of non-lethal hazing will continue as required by our NMFS CSL removal authority and in hopes of deterring any newly arriving predators that have not become acclimated to hazing efforts. We feel that some level of shore-based hazing near fishways is important and support the continuation of this activity by USACE and USDA Wildlife Services staff. We plan to coordinate directly with USACE, USDA Wildlife Services, and CRITFC on all hazing efforts.

Use of the non-lethal hazing tools will be carried out as outlined in recommendations made by FPOM in 2007. All interactions with sea lions and hazing efforts conducted will be recorded as they occur and summarized in a project report (prepared by ODFW, WDFW, and CRITFC).

JUSTIFICATION OF THE PROPOSED STUDY AREA

Much of the justification for this project is described in the background section of this document. Since Bonneville Dam is the first major restriction to fish passage on the mainstem lower Columbia River (RM145), it is the location where most pinniped predation activity is likely to occur. Several years of preliminary work on this issue has been carried out at this location documenting the problem and evaluating various tools and approaches to reducing salmonid losses caused by pinniped predation. Bonneville Dam is the site identified in the States' Section 120 request to NMFS for lethal removal authority. The ability to capture and remove sea lions in this area was demonstrated by the trapping operations conducted in 2007-2013.

SCHEDULE

Planning, operations, and safety training. In consultation with Bonneville Project and USACE Fisheries Field Unit and Bonneville Project staff (Robert Stansell and Ben Hausmann) we will schedule planning meetings, training, and safety reviews prior to the initiation of major operations within the BRZ. Our first meeting with key project staff will take place in late January or early February. We will consult regularly throughout the season with USACE staff on all operations. While the bulk of trapping operations will end by June, other on-water operations in the BRZ (e.g., trap maintenance and any fall trapping activities) will continue through the end of 2014.

Placement and use of sea lion capture floats. We plan to move and anchor the floating sea lion traps into place below the dam (as described above) in March 2014. The traps will be locked closed to prevent use by sea lions until a week or two before trapping operations are scheduled to begin. We will begin capture, marking, and/or removal operations as soon as sea lions in the area and begin using the traps as resting areas. We plan to use our barge to handle and mark the sea lions, but will occasionally request the assistance of the USACE rigging crew for the removal of predatory sea lions to our vehicles on shore. We will be able to provide ample notice of our needs to USACE staff, usually planning at least one day ahead of time. If sea lions are regularly using the trap, we anticipate capture and marking activities to take place 2-4 times per week, depending upon use of the trap by pinnipeds. Spring trapping and marking activities will occur through the end of May. Additional trapping, marking and removal operations may take place in the fall of 2014 if known predatory CSL are observed in the area at that time.

On-water pinniped hazing. Some non-lethal hazing from boats (and shore) focused on increasing trapping opportunities may begin once traps are deployed in early March. Staff involved in this activity will receive all required state and federal training for these operations. Additional boat-based hazing activities directed toward CSL may take place through May. All boat-based hazing activities in the BRZ will be coordinated daily with Control Room staff, USACE Fisheries Field Unit personnel, and USDA Wildlife Services staff conducting hazing activities from the project facilities. VHF-radio contact will be maintained with Control Room staff are active in the BRZ.

Trapping operations

Spring 2014 sea lion trapping and handling activities will begin in late March and continue through late May. Trapping operations in the Bonneville Pool may occur on an unpredictable basis depending upon use of traps by sea lions. All trapping operations will be coordinated with Bonneville Project staff and Control Room personnel.

In recent years, a small number of predatory CSL have been observed foraging for salmonids in the BRZ during fall months. We plan to be ready to capture and remove known individual predatory sea lions using the traps at any time of the year. This may necessitate redeploying the traps to alternate locations in the fall to entice the sea lions to use them as resting areas. The timing and locations for this deployment will be determined by the presence and behaviors of the sea lions in the fall of 2014.

Removal of individual predatory sea lions.

Removal of predatory CSL would begin as soon as the animals arrive at Bonneville Dam, usually in late March or early April. As was done in previous years, we will coordinate these activities with USACE, NMFS, federal, state and local law enforcement, and others with respect to capture, relocation, removal, temporary holding, transportation of live animals, collection of biological specimens, and safety and security needs. We will schedule and hold project evaluation meetings on trapping and removal operations, and all other activities, as necessary through the end of the calendar year.

Scat (fecal) sample collections. We plan to collect fecal samples from any haul-out site used by pinnipeds within the BRZ on a daily basis from January through the end of 2014. Haul-out sites used by sea lions will be checked regularly from boats or shore and samples will be collected as they are available.

Block sea lion access to part of the Corner Collector apron. Throughout the 2014 season we will monitor the concrete blocks placed on the apron below the corner collector wall to insure they remain in place and to evaluate their effectiveness at keeping sea lions from using the area as a haul-out site.

FACILITIES AND EQUIPMENT REQUIREMENTS

Movement and mooring of the traps in the water will be conducted by our project staff and vessels. At the end of the project we request permission to moor the traps and handling barge against the existing pilings and in the dead water area below the old navigation lock on the south side of PH1.

We may occasionally request the assistance from the Bonneville rigging crew to remove individual predatory sea lions from our handling barge on the water to our transport vehicles on shore or to remove equipment (e.g. traps or barge) from the water for maintenance. We expect trapping to occur 2-4 days per week and will make every attempt to schedule particular days for this activity so that we minimize conflicts with other project work. On the water we will move sea lions from the traps into smaller transfer cages that can be lifted from the handling barge and placed in the bed of our

pickup truck or placed into the 5th wheel sea lion trailer. When it better fits the work schedule of the rigging crew and our staff, we will request to barge captured animals through the navigation lock and above the forebay to the gravel boat ramp behind the Bonneville service building. We have successfully used this ramp in the past to launch and retrieve boats, equipment, and sea lions.

We request permission to moor one vessel at the dock below the navigation lock on a daily basis, as was done in previous years. Having a boat at this location is essential for quick access to our other vessels moored below the old navigation lock and our traps. This is particularly important for pre-dawn capture operations, security, and the ability to quickly respond to any emergency situation involving the traps. We will make every effort to keep our boat on the inside of this dock (except during extremely low water conditions). Our other boats and barge will be moored at the log booms below the old navigation lock.

We will require security access for our staff to enter and leave both the Oregon and Washington sides of the facility on a daily basis. We request access to the project at night, primarily late evening and pre-dawn hours, to monitor and operate the sea lion traps. In recent years, our most successful trapping has occurred during the two hour period before daylight. As in previous years, we will contact Bonneville Control upon entry to the project during these hours.

There will be additional needs related to removal of live or dead sea lions (e.g., use of a fork lift and work space). We will plan to use the space made available to us in previous years in the metal storage building on the north side of the spillway as a secure site for handling sea lions to be euthanized and examined post-mortem. Additional requests for assistance or equipment will be discussed with Bonneville Project staff as needed during the work season.

PROJECT IMPACTS

Project Services

Our staff will need security access to both sides of the Bonneville Project on a daily basis from January 1 – December 31, 2014. We request permission to operate our vehicles on the project to access our sea lion capture equipment (Cascades Island), Service Building boat ramp area (Bradford Island) and moored vessels below the navigation lock (Robins Island). All project staff will require USACE identification badges. Hard keys to access locked areas will be limited to select project staff.

Security

Since our sea lion capture operations will take place on Cascades Island, these activities and equipment will be secure from public access. Our vessels will be used daily in the BRZ and secured nightly at the mooring dock below the navigation lock and below the old navigation lock. Standard sea lion capture, marking, and release operations should

not require additional security. However, increased security including staff from the States' Fish & Wildlife law enforcement teams may be used during any permanent removal operations (e.g., transfer to captivity or lethal removal). At least a moderate level of public interest can be expected, including the potential for protests by some groups opposed to permanent removal operations.

Safety

General

All project staff will read the Corps of Engineers General Safety Requirements Manual (#385-1-1). All staff will receive a safety briefing by USACE staff and a complete orientation of the project, including identification of hazards on land and in the water.

BRZ Boat Operations

In addition to the standard review of safe boat operations in the BRZ provided by Ben Hausmann (Bonneville Project), state agency staff will provide boat operators and crew with a thorough briefing to include the following: safety equipment checklists, vessel safety checks, review of appropriate clothing and use of floatation gear, radio communication checks (in and out of BRZ) with Bonneville Control, other communication methods and protocols (e.g. cell phones, contact names and numbers), procedures for reporting an emergency, "man over board" equipment and procedures review, etc. We will conduct in-season safety reviews and discussions among our staffs and at the request of Bonneville Project staff to review specific issues that arise during the year.

Sea lion handling

At the suggestion of Bonneville Project management in 2009, we added additional precautionary actions to our Job Hazard Analysis for handling sea lion cages by crane operation on Cascade Island above the traps. These include restricting access to the work area to all but the essential crew members and insuring the use of hard hats by our staff.

Job Hazard Analyses

The Job and Activity Hazard Analyses for activities related to this work are attached to this document.

LIST OF BOATS, PERSONNEL AND VEHICLES

REG.	NAME	LENGTH/MAKE	AGENCY	POC
R-4	Research 4	24' Almar	WDFW	Jeffries, Steve
R-5	Research 5	24' Almar	ODFW	Brown, Robin
R-6	Research 6	22' Boston Whaler	ODFW	Brown, Robin
R-7	Research 7	19' Boston Whaler	WDFW	Jeffries, Steve
OR 997UB	Duckworth	21' Duckworth	ODFW	Brown, Robin
WDFW 539	WDFW 539	25' TuffBoat	WDFW	Jeffries, Steve
WDFW 501	WDFW 501	21' North River	WDFW	Jeffries, Steve
WDFW 31	WDFW 31	22' North River	WDFW	Jeffries, Steve
WDFW 901	WDFW 901	22' Boston Whaler	WDFW	Jeffries, Steve
Sea Dory	Sea Dory	22' Sea Dory	CRITFC	Hatch, Doug

NAME	AGENCY	ACTIVITY
Brown, Robin	ODFW	BRZ Boat Ops, Sea Lion Captures
Jeffries, Steve	WDFW	“ “
Gearin, Pat	NMFS	“ “
Norberg, Brent	NMFS	“ “
Wright, Bryan	ODFW	“ “
Burco, Julia	ODFW	“ “
Riemer, Susan	ODFW	“ “
Jonker, Sandra	WDFW	“ “
Brown, Mike	WDFW	“ “
Oliver, Josh	WDFW	“ “
Lambourn, Dyanna	WDFW	“ “
Tennis, Matt	PSMFC	“ “
Heiner, Dan	PSMFC	“ “
TBA (4)	PSMFC	“ “
Hatch, Doug	CRITFC	“ “
Whitaker, John	CRITFC	“ “

LICENSE	ST	DESCRIPTION	COLOR	AGENCY	POC
E226583	OR	Dodge PU	White	ODFW	Brown, Robin
E254783	OR	Ford PU	White	ODFW	Brown, Robin
2633M	WA	Ford PU	Green	WDFW	Jeffries, Steve
US Gov	US	Chev PU	White	NMFS	Gearin, Pat
1033M	WA	Ford PU	Green	WDFW	Jeffries, Steve
5840M	WA	Dodge PU	Green	WDFW	Jeffries, Steve

BRZ Access Request

Number: **2014-**

Date Requested: 11/13/2013

Title: Sea lion capture, marking, tracking, hazing and removal in the BRZ

Project Point of Contact: Ben Hausmann

Requested By: ODFW, WDFW

Requester Point of Contact: Robin Brown (ODFW); Steve Jeffries (WDFW)

Scope of work: Perform sea lion capture, marking, tracking, hazing, and removal operations in the BRZ to reduce predation losses of salmonids.

NOTE: SPILLWAY TO BE ON SEAL EXCEPT BAYS 1 AND 18. BAYS 1 AND 18 TO BE OPEN NOT GREATER THAN 4".

SPILLWAY REMOTE HOIST FEEDER CIRCUIT BREAKERS TO BE OPEN AND CLEARANCE APPLIED.

Schedule for 2014: Deployment of sea lion traps is planned for early March. Limited boat-based sea lion hazing activities in the BRZ may begin once traps are deployed. Boat operations in the BRZ to capture sea lions is expected to occur 2-4 days per week from March through May. Boat operations to conduct maintenance or to move sea lion traps may occur at any time during 2014, including all areas of the BRZ tailrace and forebay. Deployment and operation of sea lion trap(s) may also take place during September through December 2014 if predatory sea lions are observed in the BRZ as they were in the fall. Some level of boat operation in the BRZ related to the above tasks is requested for the 2014 calendar year under this permit.

Map: All areas of BRZ tailraces and forebay.

Boat Operators: ODFW, WDFW, NMFS, PSMFC and CRITFC trained boat operators.

Flag Issued: NO

JHA:

AHA:

Radio Frequency: Marine Band 14

Pre Work Safety Meeting: October 15, 2013

JOB AND ACTIVITY HAZARD ANALYSIS: GENERAL OPERATIONS RELATED TO SEA LION TASKS

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Hazing boat operations in BRZ.	Slip hazards on ramps and docks.	Wear rubber-soled boots and personal flotation at all times.
	Lifting heavy equipment; potential for muscle and back strain.	Never attempt to lift heavy objects alone; use safe lifting techniques such as lifting with legs rather than back.
	Working in severe weather.	Monitor weather forecasts; prepare for severe weather conditions. Wear appropriate layers of warm and waterproof clothing; carry spare dry clothing.
	Working in boats.	Conduct pre-season safety meeting to review all potential hazards, safety concerns, emergency response. Conduct twice monthly safety debriefings of boat crews to identify any new safety issues. Carry Bonneville Project staff (e.g., safety officers) as operations monitors as requested (as least monthly). Use dedicated boat operator with no additional duties at any time. Maintain safe and appropriate speeds and maneuvers as dictated by water conditions, proximity to structures, shorelines, anglers, etc. Wear personal floatation at all times; keep life ring with 50' line available at all times. Maintain VHF marine radio contact with Control Room for reporting emergencies; keep cell phones available and charged, along with emergency phone contact list. Be aware of all BRZ safety hazards such as underwater turbulence near spills and outflows, overhead wires and submerged equipment.
	Use of pyrotechnics; potential for burns, eye and hearing damage.	All staff will receive firearm safety and use training. Gloves will be worn as appropriate. Eye and ear protection will be used at all times. Specific instruction in the use and deployment of various hazing tools will be given to all staff. First aid supplies will be carried at all times.
2. Sea lion trap operations.	Lifting heavy equipment; potential for muscle and back strain.	Never attempt to lift heavy objects alone; use safe lifting techniques such as lifting with legs rather than back.

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Potential for being struck by falling objects; head or foot injury.	Always wear hardhats and steel-toed boots. Be aware at all times of location of crane, boom and lift cables.
	Sea lion bites.	Only experienced staff will be in close proximity to sea lions, handling boards, and transfer cages. Gloves and protective clothing will be worn.
	Working on boats and trap in the water when sea lions present.	Always wear personal flotation (and safety lines as necessary). Keep life line and throw ring at ready.
3. Scat (fecal) collections.	Working near water.	Personal flotation will be worn at all times.
	Personal sanitation.	Gloves and other appropriate equipment will be used during collection, storage, and processing of samples.

JOB HAZARD ANALYSIS: BONNEVILLE SEA LION CAPTURE OPERATIONS

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS (FROM EM 385-1-1)
1. General boat operations in BRZ	All hazards	All boat operations in BRZ will be conducted under safety guidelines previously described in Job Hazard Analysis submitted for work in 2007 as permitted under BRZ permit Nos. 07-004 and 07-013; PFDs will be worn at all times (see Controls under “General Operations” in previous hazard analysis above).
2. Boat safety specific to capture operations	Collisions, anchor line entanglements, etc., during close operations near trap and other boats	Boats will be operated a very low speeds while near trap, anchor lines and other project vessels; communications between vessels will be maintained via VHF radios on working channel 82
	Man overboard (MOB) from boat or sea lion trap	Upon MOB incident, MOB alert will be relayed to all project staff, boat motors will be placed in neutral gear until whereabouts of MOB is clearly determined; all boats will be equipped with throw life rings, float cushions, safety lines and boat hooks; one boat (R-6 22’ open Boston Whaler) is designated as primary MOB recovery boat; other boats will assist as necessary; all staff will receive instructions regarding MOB recovery; in each boat one person on each boat will be designated as lead for MOB recovery (responsible for safety ring, etc.); second person will assist with recovery; third will operate boat ONLY; condition of MOB will be assessed once onboard; if in danger of hypothermia, MOB will be immediately transported to Nav Lock dock for treatment; (emergency medical assistance may be requested); in the event MOB is unconscious, Bonneville Control will be notified immediately, emergency medical assistance will be requested to Oregon side, (Nav Lock dock); crew members will be CPR/First Aid certified

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS (FROM EM 385-1-1)
3. Working on sea lion trap	Falling in trap	Only experienced staff (10-20 yrs of trap procedure operations) will work on trap; there are multiple staff from ODFW, WDFW, and NMFS with this experience and will be so-designated; PFDs and hard hats will be worn at all times; crew on trap will be in VHF radio communications with boats and crane operation crew on shore; anyone falling in trap will be assisted by experienced crew on trap to divert sea lions with poles/crowder boards and help persons climb out of trap; any injuries will be assessed immediately and appropriate medical response will be taken (e.g. first aid and/or call to Bonneville Control for emergency medical assistance to Oregon side, Nav Lock dock);
	Sea lion bites	Experienced staff on trap will remain vigilant regarding sea lion locations and movements within trap to minimize chance of being bitten; any one bitten will have injury assessed immediately; injuries worse than broken skin (e.g. open wound in muscle; broken bone) will result in immediate report to Bonneville Control requesting emergency medical assistance and transport of injured staff to Oregon side, Nav Lock dock
	Bodily injury from mechanical sources	Hardhats and protective gloves will be worn by staff working on trap; any injuries to extremities caused by movement of equipment will be immediately assessed and responded to as appropriate (see sea lion bites)
4. Crane work on deck	Potential for being struck by falling objects causing head injury or foot injury.	Project staff not part of USACE rigging crew will stay well clear of crane operations; be aware, at all times, of the location of the crane and the crane boom; staff may assist with transfer of sea lions from lifting cages to trailer or truck, following guidance of rigging crew; always wear hard hats, steel-toed boots and hand protection (*05.D.01, 02, 04, 05, A.08, and 08.A-.B). Avoid climbing on top of equipment; remain on ground.
	Lifting heavy equipment causing the potential for back strain.	Never attempt to lift a heavy object by yourself; use a back brace; use safe lifting techniques such as lifting with your legs rather than with your back.
5. General precautions	Crane operations	Be aware of crane boom position at all times; remain well clear of boom and lift cage until loading to trailer of truck is taking place; hardhats and protective gloves will be worn by staff working near crane, cages, trailer or trucks

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 ODFW, WDFW, CRITFC, PSMFC, NMFS – November 15, 2013

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS (FROM EM 385-1-1)
	Working in severe weather.	Be alert to and prepare for severe weather; wear several layers of warm clothing for protection from the cold and, as the weather indicates, a waterproof over-garment to be protected from the rain (*06.J).
Crane, boats, sea lion trap, cages, trailer, trucks	Inspections and experience with equipment required prior to use	Instruction or review in using equipment according to the manufacturers' instructions; USACE rigging crew will oversee and conduct crane operations; all boat operators will be trained and have necessary levels of experience; only experienced project staff will work on trap; documented safety meeting prior to work. First Aid/CPR training (*03.A.02 and 03.D)

Appendix: Project History

2005

In the spring of 2005 a test of non-lethal hazing tools to deter sea lions from occupying the BRZ at Bonneville Dam was conducted by USACE, NMFS, ODFW, and WDFW. This test indicated that hazing was effective at temporarily moving sea lions away from fish passage entrances. In 2006 USACE installed sea lion excluder devices (SLEDs) to keep sea lions from entering fishways and used underwater acoustic deterrents in an attempt to discourage sea lions from foraging near the fishway entrances. United States Department of Agriculture (USDA) Wildlife Services personnel also conducted dam-based hazing using pyrotechnics and shellcrackers in addition to these operational modifications. These tools were evaluated using a 2-day on/off random block sampling design. Also in 2006 ODFW and WDFW, with assistance from CRITFC, conducted more intensive hazing efforts using boats in the BRZ and downstream to Navigation Marker 85 (Marker 85). This hazing was conducted on a 4-day on/off random block design in order to avoid influencing the USACE test of SLEDs and hazing at the project. Results of the USACE analysis of the combined dam and boat hazing efforts were equivocal and an overall positive effect at reducing pinniped numbers and predation rates could not be identified.

2006

In November 2006 the States of Oregon, Washington and Idaho applied to the Secretary of Commerce under Section 120 of the Marine Mammal Protection Act (MMPA) for authority to lethally remove individual CSL that were repeatedly observed taking threatened and endangered salmonids below Bonneville Dam.

2007

In January of 2007 NMFS notified the States that their application for lethal removal authority for CSL at Bonneville Dam had been accepted. The States recognized that a test of a more complete hazing effort would be required prior to obtaining approval to lethally remove individual sea lions. As a result, in 2007 ODFW, WDFW and CRITFC conducted boat-based non-lethal hazing activities in the BRZ and down river to Marker 85 seven days per week, nearly all daylight hours, from late February through late May. In addition, ODFW and WDFW deployed a floating trap in the BRZ and conducted sea lion capture operations from February 21 through May 23 (see Brown et al, 2007, Field Report: 2007 Pinniped Research and Management Activities at Bonneville Dam). In the fall of 2007 NMFS convened a Pinniped Task Force to further review the States' request and to make recommendations to NMFS as to whether and how to authorize and implement any lethal removal actions that might be permitted.

2008

In February of 2008, NMFS approved the States' application and authorized the lethal removal of up to 85 animals per year (for 5 years) from a list of known predatory CSL provided with the authorization. Meanwhile, non-lethal boat-based hazing activities in the area below Bonneville

Dam were coordinated with USACE and USDA (see Brown et al, 2008, Field Report: 2008 Pinniped Management Activities at Bonneville Dam). Crews from ODFW, WDFW, and/or CRITFC hazed sea lions from boats over 89 days from 12/11/07-5/15/08. A total of 749 hazing events were recorded during which 830 and 523 “takes” of CSL and SSL occurred, respectively. A total of 9225 cracker shells, 3148 seal bombs, and 590 rubber buckshot rounds were used during hazing activities. These non-lethal hazing actions occurred in the area from Bonneville Dam downstream to Cape Horn, with the focus being the BRZ and the area immediately downstream to River Marker 85. Approximately one-fifth of all hazing events involved an observation of a salmonid being killed (178 fish total). Salmonid predation was documented both inside and outside the tailraces, as far downriver as Skamania Island (approximately 9 miles below the dam).

By mid-April of 2008, four sea lion traps had been deployed along the Corner Collector wall in the tailrace of PH2. Under the State’s MMPA Section 120 authorization, sea lion capture events occurred on April 24 and April 28, 2008; a third unplanned event occurred on May 4. During the latter event the doors on two of the four traps were found closed for unknown reasons with animals inside which subsequently died. A total of 15 CSL were captured: six were transferred into permanent captivity at Sea World; four were branded and released; one died while under anesthesia during health screening; and four died on the traps. A total of 4 SSL were captured: two were released on site and two died on the traps under unknown circumstances during the May 4 event (see Brown et al, 2008, Field Report: 2008 Pinniped Management Activities at Bonneville Dam).

2009

In 2009 the States, in cooperation with the other agencies involved, conducted observations, hazing, capture, marking and removal of sea lions below Bonneville Dam as authorized by NMFS (see Brown et al, Field Report: 2009 Pinniped Management Activities At And Below Bonneville Dam).

In summary, during 2009, boat-based pinniped hazing crews from ODFW, WDFW, and/or CRITFC hazed sea lions on 57 days (78 boat-days) from 1/13/09-5/15/09. Severe weather (snow, ice, high winds) often prevented safe boat operation in January and February. Hazing resulted in a total of 612 and 427 “takes” of CSL and SSL, respectively. A total of 10,227 cracker shells, 1,627 seal bombs, and 168 rubber buckshot rounds were used during deterrent activities in the five mile section of river below the dam.

A total of 21 CSL were captured in 2009: four of the sea lions that were listed for removal were transferred into permanent captivity (two to the Shedd Aquarium in Chicago IL and two to the Gladys Porter Zoo in Brownsville TX); eleven of the listed animals were chemically euthanized; and six sea lions not on the removal list were instrumented, branded (if they were not already marked), and released on site. The objectives of this latter work included gaining a better understanding of movements and foraging behaviors (including night activity) of sea lions in the Bonneville Dam area (see Brown et al, Field Report: 2009 Pinniped Management Activities At And Below Bonneville Dam).

Based on a bioenergetics modeling approach, we estimated that the removal of the 26 CSL during 2008 and 2009 prevented the loss of approximately 1,655 additional salmonids. An alternative method based on the observed minimum number of salmonids observed by USACE observers resulted in an estimated 773 salmonids saved over the two-year period (95% confidence interval: 528 to 1,054).

On 10/01/09 a sea lion trap was moved above the dam and placed in the forebay between the navigation lock and PH1 in an attempt to trap an animal (C697) that had locked above the dam on 5/16/09 and subsequently spent the summer in the area from Bonneville Dam to The Dalles Dam. This sea lion was repeatedly observed by USACE staff consuming salmonids at the fish ladder exit in the forebay area near the Oregon side visitor's center.

2010

On 01/25/10 C697 was captured on the trap in the forebay and, since this animal was not on the removal list (had not been seen killing salmon in the observation area “below the dam”), it was released (on the ocean beach west of Astoria). On 03/09/10 C697 was captured on a floating trap below the dam and was released on site; C697 was subsequently observed killing salmon in the observation area below the dam, thus qualifying for removal, and was trapped and euthanized on 04/06/10.

All activities conducted in 2010 were described in our annual field report (see Brown et al, 2010, Field Report: 2010 Pinniped Management Activities at and below Bonneville Dam). In 2010, CRITFC and the States continued boat-based hazing efforts to deter pinnipeds from foraging on salmonids. Hazing was focused on the BRZ in 2010, with less effort in the five miles of river below the BRZ than in previous years.

A total of 22 individual CSL were captured in 2010, fourteen of which met the criteria for removal and were euthanized (no facility was available to receive candidate seas lions). The remainder were branded as necessary and released; five received acoustic transmitters with depth sensors. Animals were captured at the dam from March 3rd to May 26th; two of the euthanized animals were captured in Astoria in early fall 2010. Weights ranged from approximately 250 lbs. (113 kgs) to 900 lbs. (408 kgs).

A total of 9 individual SSL were captured in 2010, all except one were branded and received one or more telemetry instruments. Animals were captured at the dam from March 30th to May 26th. Weights ranged from approximately 500 lbs. (227 kgs) to 1500 lbs. (680 kgs).

We modeled the effect of removals based on the 38 of the 40 CSL that have been either intentionally or accidentally removed in 2008, 2009, and 2010 and were either on the list for removal or had qualified for the list (i.e., we excluded two accidental mortalities of animals from 2008 that had not yet qualified for removal). The effective sample size, however, was only 36 sea lions because two of the animals were removed in fall 2010 and therefore won't result in fish savings until spring 2011. Based on the simulation model, the predicted number of salmonids that would have been required from 2008 to 2010 by 36 CSL at Bonneville Dam was between 1357 and 4921 fish. On average, fish saved per sea lion in removal years was estimated to be from 17 to 60 fish and in each subsequent year from 22 to 88 fish.

2011

In November 2010, the 9th Circuit Court of Appeals overturned the NMFS authority granted to the States for lethal removal of predatory CSL. As a result, no permanent removals of predatory sea lions were conducted for most of the 2011 field season, even though the opportunity to capture sea lions previously listed for removal did occur during operations to mark new predatory sea lions (see Brown et al, 2011, Field Report: 2011 Pinniped Management Activities at and below Bonneville Dam). Thirteen CSL and 10 SSL were captured, branded, marked with various instruments, and released on-site. Use of GPS-phone tags provided a substantial increase in the amount of information available to described sea lion foraging and movements in the area. Boat-based, non-lethal hazing (more limited than in previous years) also took place during the 2011 field season in coordination with USDA Wildlife Services staff operating from shore on dam structures. Again, hazing had little overall effect on sea lion foraging activities, other than to temporarily displace predators from one area to another.

On May 13, 2011 NMFS issued the States a new authority for lethal removal of predatory CSL. However, only one (1) listed sea lion was permanently removed under the new authority prior to the end of the field season in late May. This authority was ultimately revoked by NMFS on July 27, 2011 on technical grounds. On August 18, 2011 the States again applied for a new lethal removal authority. NMFS has accepted the application, has held a third Pinniped Fishery Interaction Task Force meeting in October 2011 to review the application.

2012

As in previous years, 2012 sea lion project activities conducted in cooperation with all agencies involved included predation observations, boat surveys for distribution and abundance, non-lethal hazing, capture and marking of new CSL and SSL, and permanent removal of known predatory CSL. These activities were permitted under the 2012 USACE Bonneville Research Packet, NMFS research permits, MMPA Section 109h non-lethal hazing authority, ESA non-lethal hazing authority for SSL, and a new NMFS authority for permanent removal of known predatory CSL issued on March 15, 2012. A complete description of these activities is provided in our annual field report (Brown et al, 2012, Field Report: 2011 Pinniped Management Activities at and below Bonneville Dam).

As in previous years, boat-based non-lethal hazing activities had little positive effect on preventing pinniped foraging in the area. Trapping activities at Bonneville Dam occurred between 2/15/12 and 5/16/12. A total of 40 sea lions (20 CSL and 20 SSL) were handled. As in previous years, a number of animals were fitted with various telemetry instruments to monitor movements and foraging behaviors. A new series of boat surveys were conducted in the 12 mile stretch of river below the dam.

A total of 13 known predatory CSL were permanently removed during the 2012 season. Since the removal program began in 2008, the USACE Fisheries Field Unit has observed a steady decrease in the average daily abundance of CSL foraging below Bonneville Dam. We believe that this observation reflects the successful removal of some of the most dominant, habitual

predatory sea lions from this area. We estimate that the total removal of 54 CSL from 2008 to 2012 saved between 3742 and 13,483 salmonids (95% CI) over that period (see Brown et al, 2012, Field Report: 2011 Pinniped Management Activities at and below Bonneville Dam).

In 2012 at least 3-4 CSL were known to be foraging in the Bonneville Pool between The Dalles and the Bonneville Projects. Multiple attempts to locate and observe these animals were made during the 2012 season. Two traps were located just above Bonneville Dam from late May through early September in an unsuccessful effort to capture and remove these animals from the pool.

2013

Again in 2013, all of the usual activities were carried out including hazing, capture and marking, tracking of individual animals, surveys for sea lion abundance in the river below the dam, collection of sea lion food habits samples, and capture for removal of predatory CSL. Four CSL were permanently removed; two were transferred to Queens Zoo in New York and two were euthanized. Surveys for sea lions from Astoria to Bonneville documented an unusually large number of animals in the river likely in response to the high abundance of Eulachon (a preferred prey species) that occurred there this year. However, this overall increase in the number of CSL found in the lower river was not reflected in a dramatic increase in CSL numbers foraging in the immediate Bonneville Dam area.

In late October 2013, a sea lion trap was moved from the shoreline at Stevenson, WA to a rocky area just above the upriver end of Bradford Island. One of the CSL (C014) that has been above the dam for two years now was observed hauling out at this location in mid-October. The trap will be monitored through the fall and winter in an attempt to capture and remove this animal from the Bonneville Pool.

Recommendations for work in 2014 (from the 2013 Field Report, included with this packet) include continuing normal field operations at the dam (i.e., hazing, trapping, marking, surveys, etc.) and trying to trap the 3-4 sea lions that are above the dam. While declining budgets continue to constrain the amount of work that is possible, a recent ruling by the Ninth Circuit Court of Appeals has ended years of litigation that has hampered full implementation of the Section 120 removal authority. We anticipate that the removal program will now continue unimpeded by litigation through 2016 when the efficacy of the program will be assessed and a decision made as to whether it needs to continue.