Facilitator's Notes for the
Willamette Falls Task Force Meeting
August 20-22, 2018

The Willamette Falls Task Force convened a meeting on August 20 through August 22, 2018 at the DoubleTree Hotel in Portland, OR.

Robert Anderson of the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) West Coast Region chaired the meeting.

Task Force Members
Robin Brown (*Marine Mammal Scientist, Retired*), **Shaun Clements** (*Oregon Department of Fish and Wildlife*), **Bob DeLong** (*Alaska Fisheries Science Center/National Marine Mammal Laboratory*), **Kelly Dirksen** (*Confederated Tribes of the Grande Ronde Community of Oregon*), **Amy Gibbins** (*U.S. Army Corps of Engineers*), **Liz Hamilton** (*Northwest Sport Fishing Industry Association*), **Charles Harry*** (*International Fund for Animal Welfare*), **Doug Hatch** (*Columbia River Inter Tribal Fish Commission*), **Robert Kentta*** (*Confederated Tribes of Siletz Indians of Oregon*), **Sara LaBorde** (*Wild Salmon Center*), **Eric Murray** (*NMFS, West Coast Region*), **Olney "JP" Patt** (*Confederated Tribes of the Warm Springs Reservation*), **Tim Ragen** (*Marine Mammal Scientist, Retired*), **Bob Reese*** (*Association of Northwest Steelheaders*), **Norm Ritchie** (*Association of Northwest Steelheaders, Alternate*), **Carl Scheeler** (*Confederated Tribes of the Umatilla Indian Reservation*), **Paul Ward** (*Confederated Bands and Tribes of the Yakama Nation Fisheries*), **Meagan West** (*Washington Department of Fish and Wildlife*), and **Sharon Young** (*Humane Society of the United States*)

* Not present

Resource Advisors
Robert Anderson (*National Oceanic and Atmospheric Administration, NMFS*), **Laurie Beale** (*National Oceanic and Atmospheric Administration*), **Matthew Falcy** (*Oregon Department of Fish and Wildlife*), **Bernadette Graham-Hudson** (*Oregon Department of Fish and Wildlife*), **Steven Jeffries** (*Washington Department of Fish & Wildlife*), **Tucker Jones** (*Ocean Department of Fish and Wildlife*), **Galeeb Kachra** (*National Oceanic and Atmospheric Administration*)**, Patricia Madson** (*U.S. Army Corps of Engineers*), **Sheanna Steingass** (*Oregon Department of Fish and Wildlife*), **Bryan Wright** (*Oregon Department of Fish and Wildlife*).

Members of the Public
Gary Wise

Write Brain LLC Consulting
Facilitator: **Jinnae Monroe**; Notes: **Marie Rowland**

Summary of Meeting

The following facilitator summary captures the presentations, group discussion, and recommendations from the August 20-22, 2018 Willamette Falls Task Force Meeting. This meeting, which was in-person and allowed for call-ins via UberConference, provided the Task Force with a platform to review information regarding pinniped-fishery interactions near Willamette Falls and discuss considerations and recommendations regarding the state of Oregon application to NMFS for approval for pinniped removal under the Marine Mammal Protection Act Section 120.

As a result of the Task Force deliberations, twelve (12) Task Force members recommended approving the state's application with modifications; three (3) abstained (United States Army Corps of Engineers, Oregon Department of Fish and Wildlife and NMFS); one (1) recommended the state's application be denied (Humane Society of the United States).

Welcome

Jinnae Monroe (Facilitator) greeted the assembled Task Force and covered the agenda and procedures of the meeting before handing the floor to Robert Anderson to describe the Task Force's purpose.

Presentations

The Pinniped Removal Authority and Purpose of Convening, Role, and Expectations of the Task Force
(Robert Anderson, NMFS)

Robert Anderson's first presentation reviewed the Pinniped Removal Authority, the purpose of convening the Task Force, the Task Force's role, and NMFS' Expectations of the Task Force. He began by briefly reviewing the MMPA Section 120 amendment, which states:

- A state may apply to the Secretary to authorize the intentional lethal take of individually identifiable pinnipeds which are having a significant negative impact on the decline or recovery of salmonid fishery stocks which –
  - Have been listed as threatened or endangered under the Endangered Species Act (ESA)
  - Are approaching threatened or endangered status; or
  - Migrate through Ballard Locks

As required by the MMPA §120(c), NMFS convened this Task Force to provide NMFS with a recommendation to either approve or deny the state's October 6, 2017 application for the intentional lethal taking of California sea lions (CSL) that are having a significant negative impact on the recovery of the Upper Willamette River (UWR) winter steelhead distinct population segment (DPS) and the UWR spring Chinook salmon evolutionarily significant unit (ESU). In formulating its recommendation, NMFS asks the Task Force to

follow the process and consider the topics identified below in the section titled "NMFS' Expectations of the Task Force."

1. Population trends, feeding habits, the location of the pinniped interaction, how and when the interaction occurs, and how many individual pinnipeds are involved;
2. Past efforts to non-lethally deter such pinnipeds, and whether the applicant has demonstrated that no feasible and prudent alternatives exist and that the applicant has taken all reasonable non-lethal steps without success;
3. The extent to which such pinnipeds are causing undue injury or impact to, or imbalance with, other species in the ecosystem, including fish populations; and
4. The extent to which such pinnipeds are exhibiting behavior that presents an ongoing threat to public safety

Following presentations from subject matter experts, the Task Force would discuss these topics before voting to recommend approval or denial of the proposed action. Consensus on the recommendation of approval or denial was preferred by NMFS though it was recognized that full consensus might not be possible. Differing opinions could be written up as alternative recommendations for future consideration if consensus was not forthcoming. NMFS will make the final decision regarding the proposed action after receiving the Task Force's recommendations.

State of Oregon Application
(Robert Anderson, NMFS)
Robert Anderson then described the application submitted by the state of Oregon, provided data on public comments received, discussed available and relevant background materials, and laid out the timeframe and process of making final decisions.

The state of Oregon submitted its application for the intentional lethal take of CSLs that it considered were negatively impacting the recovery of UWR spring Chinook and winter steelhead on October 6, 2017. By October 10, 2017, NMFS had determined the application provided sufficient information to warrant further review; a Federal Register notice published on November 9, 2017 solicited public comments for a period of 60 days. Of the 792 comments received by January 9, 2018, 677 voiced support for the lethal take of predatory sea lions while 99 opposed it; 16 neither supported nor opposed the application, rather nominated members for the Task Force/were unclear in their position.

The Task Force met from August 20 to 22, 2018 and has 60 days to submit its recommendations to NMFS. Subsequently, NMFS has 30 days to either approve or deny the state's application.

Marine Mammal Protection Act Section 120 Retrospective
(Robert Anderson, NMFS)
Robert Anderson reviewed the history of pinniped-fishery interactions and previous removal efforts. Between 1986 and 1992, CSLs consumed 42% and 65% of the winter steelhead of the total Lake Washington winter steelhead run near or passing through

Ballad Locks (Seattle, WA). This stock never recovered and is considered functionally extinct today. To prevent further extinctions and in accordance with the MMPA's Section 120 amendment, states can now apply for the authority to take individually identified pinnipeds that are having a significant negative impact on the decline or recovery of such salmonid stocks.

The U.S. Army Corps of Engineers (USACE) started assessing pinniped predation at Bonneville Dam in 2002. Pinniped predation estimates are based on extrapolated observer data collected at the dam. Throughout the 2000s, salmonid loss to CSL predation gradually increased, from 0.35% in 2002 to its peak in 2007 when consumption estimates of at-risk salmonids at Bonneville Dam was 4.17%. (Predation in 2017 totaled 1.86% of the Bonneville Dam run.) It is important to note that percentages of predation fluctuate considerably depending on several factors, including interannual variability of the salmonid run size. The States began removing CSLs in 2008; and efforts have continued into the present.

The latest concern, however, lies with Steller sea lions. Although Steller sea lions are typically seen preying on sturgeon or other non-protected fishes, recent Bonneville Dam data suggests they are now having an impact on the salmonid stocks as well. Predation by pinnipeds (California and Steller sea lions) has ranged from a low of 0.35% in 2002 to a high of 5.5% in 2016. In 2017, it was estimated that pinnipeds consumed 4.54% of salmonids passing at Bonneville Dam—of which CSLs consumed 1.86%. Monitoring efforts are continuing, but it is possible a second application for lethal take of Steller sea lions at Bonneville Dam will be submitted in the future.

To date, 219 CSLs have been removed, either through placement into captivity (15), through lethal methods (197), or accidental mortalities (7). The estimated total number of salmonids lost to all pinniped predation from 2002-2017 at Bonneville Dam is 68,288 fish, of which 53,689 are attributable to CSLs. Using predation estimates in conjunction with bioenergetic models (calculating food requirements), CSL removal has prevented the loss of 23,000-30,000 additional salmonids at Bonneville Dam since 2008.

Discussion:

> **Question: (Tim Ragen)** How was the estimated numbers of salmonids lost calculated?
> **Response: (Robert Anderson)** The calculation is a combination of observed predation and other adjusting factors, such as total observation period or estimated consumption rates per sea lion.

Next, Sharon Young brought up the topic of the removal program's effectiveness.

> **Comment: (Sharon Young**) To clarify for Task Force members who are unaware, this estimate of consumption (based on the bioenergetics model) does not account for subsequent, potentially compensatory, predation resulting from

new pinnipeds coming into the area and replacing the animals who were lethally removed.
Response: (Robert Anderson) No, it does not account for influx, but it targets the core nutritional requirements to give us a minimum number of fish that could have been consumed specifically by so many pinnipeds.
Comment: (Shaun Clements) To Sharon's point, we need to consider the carrying capacity for CSLs at Bonneville Dam when thinking about the impact of new animals that recruit after a sea lion is lethally removed. My understanding is that we are a long way from being at CSL carrying capacity at Bonneville, hence recruitment of a new animal will occur whether we remove an animal or not. In this instance, by removing animals we are able to keep CSL well below carrying capacity at the dam and therefore save some salmon from predation.
Comment: (Liz Hamilton) Given the span of the Columbia, there is ample haul-out space available.
Comment: (Sharon Young) We know from tagged sea lions and visual observations that CSL density varies along the river, but the data suggests these CSLs are transiting relatively quickly from the estuary mouth to the dams.
Response: (Steven Jeffries) That's true to an extent, however there are also haul-out spaces on docks closer to dams and food sources. The CSLs may also be taking fish in the river itself, not only at the dams.
Comment: (Tim Ragen) I recall that of the tag data, only ~5% of CSLs marked in Astoria made it to Bonneville Dam.

Question: (Tim Ragen) How effective are the salmonid management programs? More specifically, are all the other salmonid management programs leading to better survival?
Response: (Robert Anderson) This is precisely what we want to do: save the fish populations. We need to find the best approach to the removal program that will allow for the greatest amount of salmonid recovery.

Comment: (Bob DeLong) While the result of the Bonneville Dam removal program was and is a good basis of information; it is not directly comparable to Willamette Falls given the Dam's larger area, number of CSLs, etc.

Comment: (Steven Jeffries) There are also some anomalies, such as the spike in CSLs in Astoria tallied from 2014-2016; during those years a warm water event in the Pacific Ocean caused a redistribution of the CSL population and an influx of CSLs into the Columbia River.

In response to this mention of water quality/conditions, Sara LaBorde asked the following question:

Question: (Sara LaBorde) Some salmon runs were impacted by poor water conditions; did this coincide with the influx of CSLs or afterwards?

Response: (Shaun Clements) Winter steelhead were impacted on their 2015 migration outward and in the ocean during 2015 and subsequently. We've seen a decreased return since 2017 as a result.

Key questions regarding management plan effectiveness and replacement vs. recruitment were highlighted as points to address again following additional presentations.

History of Willamette Falls
(Shaun Clements, ODFW)
Shaun Clements reviewed the history of Willamette Falls. Historically, Willamette Falls was an important fishing and trading site for Native Americans. Post-European development of the region included paper and mill industries that operated on the left and right sides of the Falls. Following the first transmission of electricity in the country in the late 1880s, the Sullivan Plant hydroelectric facility was constructed on the left bank. Due to the changes at the Falls, anadromous fishes migrating from the ocean to spawn in freshwater likely dealt with more difficult passage conditions. Fish ladders were constructed to make the passage easier.

Historically, only winter steelhead, spring Chinook, and lamprey were able to pass the Falls during the winter/spring freshets/floods. The current fish passage facility at Willamette Falls was completed in 1971 and while it is equipped with a counting area (beneficial for assessing salmonid population throughout the season), the infrastructure is in need of repair/updating. Each ladder (3 total) is 6-9 meters (20-30 feet) high, with openings 1.5-2 meters (5-6.5 feet) in width; it is partially submerged and is equipped with sea lion gates. These ladders allow year-round passage, so Coho, fall Chinook, and summer steelhead runs are now entering the Willamette Basin as well.

Discussion:
Steven Jeffries inquired if any lamprey fish passages existed in the region; Shaun Clements was unaware of any built specifically for lamprey at Willamette Falls or the USACE dams in the basin.

Question: (Liz Hamilton) Are fish aggregating in attraction flows from Sullivan Plant?
Response: (Shaun Clements) Fish do enter the cul-de-sac near the Sullivan Plant turbines and likely delay there to some extent, however, a separate attraction flow near the mouth of the fish ladder guides them to the passage.
Follow-Up Question: (Liz Hamilton) With the redevelopment occurring at the Falls, does Pacific Gas and Electric (PGE) have plans to continue generating at Sullivan Plant?
Response: (Shaun Clements) PGE has heavily invested in updating their facility. I cannot speak for their long-term plans, but my understanding is they will continue.

Question: (Tim Ragen) How long do salmonids remain at the base of a fish ladder prior to migrating up?

Response: (Shaun Clements) I do not have a definitive time span to cite; the amount could fluctuate based on numerous environmental factors salmonids use as migratory cues.

Salmonids in the Upper Willamette River
(Bernadette Graham-Hudson, ODFW)

Bernadette Graham-Hudson presented on the life histories and status of salmonids within the Willamette Basin. Adult winter steelhead and spring Chinook salmon can be found ascending Willamette Falls from December through May and April through August, respectively, as they migrate to their natal spawning grounds. Depending on timing and parental origin, different tributaries are favored by these migrating fish. For instance, earlier runs comprised of hatchery winter steelhead use the western tributaries of the Willamette River, while later, wild runs use the eastern tributaries. Because of the conservation importance of the wild runs, much of the conservation effort is focused on the eastern tributaries.

Winter steelhead arrive in their mainstem spawning habitats to breed between March and June. Young winter steelhead will hatch and emerge between April and August and remain in freshwater for 2 to 3 years before migrating back to the ocean. Spring Chinook spawn from August to October in larger headwater streams; their offspring emerge between December and March and juvenile residence time in freshwater is variable. Spring Chinook migrate towards the ocean either at 2-5 months or at 12-14 months, presumably to reduce their vulnerability to predation. Their migration behavior can vary within local tributary populations and, taken together, these staggered migrations can significantly influence run compositions in future years. Therefore, monitoring is crucial for determining stock status. Hatchery-reared fish are raised and released to migrate in the spring because spring migrants have a higher rate of return.

The decline in populations (beginning in the 1980s) triggered the listing of winter steelhead and spring Chinook under the ESA in 1999, which put regulatory mechanisms in place to recover the stocks. Following an initial rebound in the early 2000's the populations have fluctuated but winter steelhead numbers have generally been in decline since the mid-2000s; the spring Chinook population was thought to have experienced less of a downward trend until mass marking of hatchery fish revealed a similar decline in wild, unmarked fish from 2002-2016, falling from ~25,000 to ~5,000.

Lack of access to spawning habitat continues threatening the recovery of both species. For example, some populations of spring Chinook migrate upriver to find access to their natal grounds blocked by dams that have no fish passage (i.e. 90% of Middle Fork Willamette habitat and ~70% of the Santiam tributary region are inaccessible due to such structures). This concern was noted in the 2008 Willamette Biological Opinion, which ultimately acted as a base for the 2011 Upper Willamette Conservation and Recovery Plan. This Recovery Plan has established a road map of conservation actions needed to delist these fishes from the ESA.

The four winter steelhead and seven spring Chinook salmon populations located in the Willamette Basin have been repeatedly assessed since 1999 and are all targeted for varied levels of recovery. To meet biological delisting criteria, a species' expected extinction risk must be measured using the Viable Salmonid Population (VSP) parameters—abundance, productivity, diversity, and spatial structure. Broadly speaking, VSP parameters for all Willamette Basin populations must improve before the biological criteria for delisting can be met.

Improvement in the VSP parameters is not the sole gauge of whether these species have recovered sufficiently to be delisted under ESA. Additional assessments examine and quantify limitations to the fishes' habitat range, danger from recreational, commercial, or educational harvest, disease or predation factors, as well as the efficacy of regulatory mechanisms.

The 2016 Status Review for winter steelhead and spring Chinook found both species remain threatened under the ESA. Although their status prior to 2016 was not such that they warranted a change to their risk categories, NMFS did note they are under ongoing pressure. As of 2016, habitat modification had not increased population viability; harvest impacts remained low and regulatory mechanisms had decreased the extinction risk slightly. Other factors such as climate change or fluctuating ocean conditions were expected to negatively impact numbers, although the extent is unknown. Of particular note, however, was the Review's assessment of predation where incoming data has shown a marked increase in predation by pinnipeds on salmonid stocks. In conclusion, the Review called for further monitoring, especially of pinniped predation, as well as updated extinction risk modeling for affected salmonid populations.

Discussion:

> **Question: (Tim Ragen)** What is the reason behind the different outputs of recovery scenarios?
> **Response: (Bernadette Graham-Hudson)** Based on the tributary, not all populations will be able to recover at the same pace or to the same degree. Some subsets will recover enough to maintain the overall population, though.
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> **Comment: (Shaun Clements)** Pinniped predation not only affects VSP abundance; it affects diversity too, based on the timing of predation. For example, the early run of spring Chinook sustains the highest impact from pinniped predation and it is this portion of the run that will likely have highest viability under future conditions as climate changes.

Upper Willamette River Steelhead and Spring Chinook Harvest Management (Tucker Jones, ODFW)

Tucker Jones spoke on harvest management strategies of UWR salmonids. State and federal authorities oversee Fisheries Management and Evaluation Plans (FMEPs). These plans outline regulations for sport and commercial fisheries and use monitoring data to provide guidance for future modification to the permanent or temporary rules under

which these fisheries operate. While federal oversight typically involves submission of an annual report to NOAA, states actively manage the fisheries themselves (e.g. establishing management goals, capping harvest levels, and distributing surplus hatchery animals).

Monitoring of sport and commercial fisheries along the Lower Willamette and Columbia Rivers (LWR and LCR) has occurred since the 1960s. Estimates of harvest for each fishery are calculated using three distinct components. The sport fishery uses effort, catch rates, and stock composition while commercial fisheries use total landings, average weight, and stock composition. Monitoring efforts occur seasonally (e.g. March-June for sport fisheries) and/or may not encompass all landings (e.g. 20-30% of commercial landings are targeted).

With respect to spring Chinook and winter steelhead, there is no targeted fishery for wild fish but Tucker Jones highlighted four fisheries capable of incidentally impacting these species: the LCR mainstem sport and commercial fisheries, the Off-Channel commercial fishery, and the LWR and Clackamas sport fishery. Based on geographic zone and season, these commercial and sport fisheries can expect to encounter varying percentages of salmonid stocks, either from wild or hatchery-reared populations. Retention of some stocks also differs depending on regions, time frame, and species (e.g. no commercial fisheries on hatchery spring Chinook in 2017 or 2018)—and in some cases may be banned entirely (i.e., as in the LCR and Off-Channel commercial fisheries).

Both winter steelhead and spring Chinook have take limits defined by the ESA within the FMEPs. Wild winter steelhead limits have been set at 20% of the population from most basins (a limit of 10% from the North Santiam) while wild spring Chinook have an outlined limit of 15%. Although these percentages may seem high, Tucker pointed out the actual take from populations is lower—only 0-3% annually for winter steelhead in the LWR (1.2% in the UWR) and a recent annual average between 8-12% for spring Chinook. Spring Chinook specifically have seen a marked decrease in annual mortality, with percentages in the Columbia and Willamette Rivers falling from 11.2% between 2002-2006 to 4.9% in 2017. After the implementation of a mark selective fishery in the UWR in 2001, harvest rates for wild spring Chinook fell from ~25% to 5%.

Tucker Jones concluded that fisheries are actively managed, stay below the impact limits set on a federal level, have minimal incidental impact on winter steelhead, and target a robust hatchery population of spring Chinook that does not interact with the wild cohort. Overall, fisheries along the Willamette River are not seen as inhibiting population recovery or facilitating further decline of these wild salmonids.

Discussion:
The subsequent dialogue addressed questions about fishery-related impacts on these salmonid runs.

> **Question: (Sara LaBorde)** Has there been a change in how to estimate fish mortality now that there are more sea lions present that may consume a wild fish

upon release or shortly thereafter? Would that type of predation not change the overall mortality?
Response: (Tucker Jones) No, fishing mortality does not currently take into account a CSL preying on a fish during or immediately post-release.
Follow-Up Question: (Sara LaBorde) Given increased sea lion presence, are there any estimates being undertaken to detect changes in post-release mortality?
Response: (Tucker Jones) Because fish caught during the season are active and lively, the likelihood of capture post release by a sea lion should be less.
Question: (Shaun Clements) Is there a change in behavior we can emphasize in the fishermen's practice of catch and release to decrease likelihood of predation by sea lions?
Response: (Tucker Jones) We do have best practices available on our website, but I am unaware of any specific outreach effort addressing this issue.
Question: (Sara LaBorde) What is the likelihood of a fisherman lingering for long near the water's surface to release steelhead if CSLs are in the vicinity?
Response: (Tucker Jones) Again, water temperatures during fishing season are relatively cold, so the fish are quite active. Releases should not take as long. Additionally, steelhead intercepts are naturally low since spring Chinook are targeted differently. While it is possible sea lions have adapted to increase their foraging efficiency on these released fish, there is currently no data supporting that scenario. I would also not place that in a lump sum with fish mortality.
Question: (Shaun Clements) To follow off Sara's question: has the estimate of post release mortality increased due to CSL presence?
Response: (Unknown) The last study I saw had mortality calculated at approximately 10%.
Response: (Tucker Jones) Yes, and there was also a recent study conducted in the Willamette River study that calculated a 12.2% mortality rate for spring Chinook.
Comment: (Unknown) There has already been a change in angler behavior; the typical practice has been modified so anglers now stay low in the boat, do not raise nets, and attempt to keep the CSLs from congregating around the boat. This has been in direct response to CSLs adapting to the older visual cues (raised nets) and targeting boats as having potential food.
Response: (Tucker Jones) Anglers have also gotten much more efficient with their catch times. Some mortality caused prior to the period when CSLs are present would have resulted from a fish spending more time being reeled in.
Question: (Doug Hatch) Have you considered including CSL attacks or fish lost to CSLs in your creel data?
Response: (Tucker Jones) That may be difficult to quantify. Although it's not a standardized question, these incidents are likely already being reported.
Comment: (Liz Hamilton) Predation by CSLs on salmonids being released was worse when hazing efforts were in effect; CSLs were being driven out of the fish ladder vicinity and into the fishing grounds, thereby increasing chances of a human-pinniped interaction. My interpretation is that since hazing has stopped, the interactions have lessened.

The discussion session ended after the final questions regarding the fisheries were asked. Tim Ragen raised the concern again over the limits set within each species' fishery, which are perceived as very high. Tucker Jones reiterated the actual impacts to the populations were lower; he also stated it is possible these limits will be adjusted when the management plans are reevaluated, although there are many individuals already working towards maintaining these lower catch limits.

> **Response: (Robert Anderson)** Yes, it is possible that upon reevaluation—provided robust data is available—that these limits could be adjusted.

One final question was asked for clarification on fishery interceptions:

> **Question: (Liz Hamilton)** Is there any overlap in the spring Chinook fishery and the listed winter steelhead returns?
> **Response: (Tucker Jones)** There is some overlap; but that overlap occurs primarily in the LWR where fishermen are specifically targeting spring Chinook. Steelhead interceptions should be rare.

Hatchery Management of Upper Willamette River Salmonids
(Shaun Clements, ODFW)

Shaun Clements had already mentioned the negative impacts caused by hydroelectric dam construction during his earlier presentation on the history of Willamette Falls. In an effort to mitigate the loss of fish as a result of dams, hatchery fish are released annually into the basin. Since listing, the release of hatchery fish has been subject to management under hatchery and genetic management plans (HGMPs). These HGMPs are reviewed by NMFS regularly to ensure hatchery operation is consistent with the recovery of these ESA-listed species.

Within the Upper Willamette Basin, there is no hatchery production of winter steelhead. Both Chinook and summer steelhead are released in the North and South Santiam Rivers, and Chinook only are released in the McKenzie and Middle Fork Willamette Rivers. *Facilitator's Note: Please see https://www.dfw.state.or.us/fish/HGMP/final.asp for additional descriptions of these individual HGMPs.* The Chinook hatchery stocks were all founded from wild populations; continued integration—bringing in new wild individuals to support the genetic viability of the hatchery stock—exists as an option for some stocks (e.g. the Middle Fork hatchery) should conditions allow. However, the recent decline in wild populations has slowed/halted regular integration. The summer steelhead is an out of basin stock that is managed to minimize interactions with winter steelhead.

Interactions between wild and hatchery populations are a concern because of the potential for introgression (gene flow between wild and hatchery-reared individuals that have migrated to the same spawning ground). Based on the differences in residence time of released hatchery vs. wild individuals, the distinct life histories displayed by hatchery vs. wild stock, and the genetics of hatchery vs. wild fish suggests there is minimal interaction between hatchery and wild fish.

Current releases vary by orders of magnitude between species and location. Spring Chinook releases for the past year have been 704,000 in the North Santiam, 1,021,000 in the South Santiam, 605,000 in the McKenzie, and 1,939,000 in the Middle Fork River; *Summer* steelhead (the primary hatchery) releases have totaled 121,000 in the North Santiam, 161,500 in the South Santiam, 108,000 in the McKenzie, and 157,000 in the Middle Fork River. Summer steelhead from the North and South Santiam Rivers will also be reduced in the coming years, to total 90,000 and 120,000, respectively.

The proportion of hatchery spring Chinook harvested in an area is estimated based on recovery of coded wire tags. Approximately 7% of the return is caught in the ocean off the Alaskan and Canadian coastlines; 42% are caught in the Columbia River, and 10% are captured above Willamette Falls, downstream of the hatchery. Approximately 40% returned to their natal hatcheries. Overall, there is minimal straying of hatchery fish.

Monitoring efforts have declined in recent years because of funding cuts by the USACE ODFW's monitoring program based out of Corvallis was conducting annual assessments of the percentage of hatchery fish returning, percentage of hatchery fish on spawning grounds, etc. to determine run timing and examine the ecological impact the fishes have on their environment. The state of Oregon hopes to recover these monitoring programs in the future to provide more insight into these patterns.

Discussion:
Doug Hatch began the brief question session by turning the topic to the key differences between hatchery and wild salmonids in the rivers.

> **Question: (Doug Hatch)** What kinds of parameters are you monitoring to make sure there is no competition occurring between the wild and hatchery fish?
> **Response: (Shaun Clements)** We have looked at residence time prior to individuals migrating to the ocean as well as what kinds of life histories are expressed (hatchery fish show a simpler life history phenotype). For monitoring adult salmonids we've focused on percentages of hatchery fish returning to the hatcheries and spawning grounds, as well as genetic sampling to ensure there's no introgression. The genetic data is only now coming in; the next step will be determining how long ago gene flow occurred, if any indeed did. Is it current or from fifty years ago?
> **Follow-Up Question: (Doug Hatch)** The hatchery spring Chinook aren't showing the same diversity of phenotype?
> **Response:** (**Shaun Clements)** Yes, that's correct.
> **Follow-Up Question: (Doug Hatch)** What is the dominant phenotype expressed? Are these hatchery fish staying longer in these freshwater habitats?
> **Response: (Bernadette Graham-Hudson)** They're reared until the smolt stage and then released; we don't see extended residence time since they rapidly migrate out at that life stage.
> **Question: (Doug Hatch)** Could these hatchery-reared fish express different phenotypes?

Response: (Shaun Clements) Provided the functional genotype needed to express that different phenotype still exists then yes, it's possible.

As there were no further questions, Bernadette Graham-Hudson returned to the podium to speak about the comprehensive recovery strategy for salmonids.

Recovery Strategy for Upper Willamette River Salmonids
(Bernadette Graham-Hudson, ODFW)
At the time the Upper Willamette Conservation and Recovery Plan was adopted (2011), pinniped predation was not assessed as a limiting factor; rather, flood control, hydroelectric, land, fish hatchery, and fish harvest management have been the factors thought to be limiting salmonid recovery. Both key and secondary limiting factors for various life stages found in individual geographic regions were established. Since the mid-1990s, investments and efforts have made significant strides towards decreasing the threats to recovering salmonid stocks.

Consistent with the Recovery Plan's Flood Control/Hydropower Management section, fish passages continue to be installed in Army Corps dams, temperature controls and flow modification technology are being added around dams, and revetments along the mainstem Willamette are slated for improvements. In addition, adult trapping facilities along the North Santiam, South Santiam, McKenzie, and Middle Fork Rivers have all been completed in the last eight years. The primary remaining actions scheduled for completion within ten years include downstream passage installations/improvements, an additional adult fish facility along the Middle Fork River, and a temperature control tower along the North Santiam. Finally, research, monitoring, and evaluation efforts will continue to better inform reintroduction efforts, passage actions, etc.

The Recovery Plan also emphasizes the need to develop additional state/federal, monitoring water quality, and implementing voluntary restoration and protective actions. Basin-wide, over 3,800 restoration projects have been completed since 1999, costing over $135 million. The projects have restored more than 160 miles of instream habitat, rehabilitated 885 miles of riparian habitat, and made over 1,100 miles of additional habitat accessible. Restoration and monitoring efforts are ongoing with funding and support coming from the Habitat Technical Team and Willamette Wildlife Mitigation Program, among others.

The primary Hatchery Actions have focused on reducing the number and effects of hatchery fish on wild spawning grounds, assessing and reducing predation on or competition among juvenile hatchery fish, and reintroducing hatchery fish above barriers as overall populations improved. Major successful strategies include marking all hatchery fish, maximizing in-basin rearing where possible, separating summer and winter steelhead spawning time to reduce future introgression, and eliminating recycling of hatchery individuals. Research, monitoring, and evaluation continue today to provide a better understanding of hatchery-wild salmonid interactions and modifications of HGMPs are under consideration.

Harvest Actions are clearly guided by existing fisheries management evaluation plans. Marking all hatchery fish has been invaluable to fisheries as harvest goals can be easily tracked and monitored to prevent exploitation. In addition, no directed harvest of winter steelhead is permitted, and changes to recreational fishing rules have allowed for controlled take of hatchery fish.

Predation by other species was a limiting factor in the Recovery Plan, however, actions called for focusing on predation by pike minnow, Caspian tern, and cormorants—not pinnipeds. This was because pinnipeds were not present in large numbers at the time the plan was written. The 2016 Status Review does cite concerns about growing pinniped predation, in addition to recommending the following future actions:

- Implement new restoration programs and expand existing ones;
- Analyze and evaluate regulations and regulatory mechanisms within all management areas;
- Repair or replace the Willamette Falls fish ladder;
- Reduce pre-spawn mortality;
- Increase public awareness of recovery efforts;
- Reduce pinniped predation.

Discussion:
Following up on her earlier presentation, Bernadette Graham-Hudson addressed some previous questions, highlighting the steps being taken to mitigate the numerous threats to salmonid population recovery. Primary questions touched on the following topics: hatchery and wild populations interbreeding, mitigating pre-spawn mortality, and the effectiveness of infrastructure modifications.

> **Question: (Tim Ragen)** Are there monitoring efforts in place to prevent wild and hatchery stocks from interbreeding and diluting the gene pool?
> **Response: (Bernadette Graham-Hudson)** Past practice for spring Chinook used wild fish to create and support hatchery broodstock. This practice hasn't been implemented for the last five years because of low returns, but will hopefully resume once new HGMPs are implemented. Since hatchery spring Chinook are founded from wild populations, introgression is less of a concern given the genetic similarity. Additionally, the hatcheries' management of summer steelhead includes efforts to separate run timing reducing the probability that hatchery individuals will breed with wild fish.
>
> **Question: (Doug Hatch)** What is the mitigation strategy for pre-spawn mortality?
> **Response: (Bernadette Graham-Hudson)** New collection facilities have helped decrease congregation time; temperature modification of water released from dams has also facilitated further migration up fish ladders in response to cues while also controlling disease levels in the Lower Willamette River waters. Pre-spawn mortality was a critical issue during the 2011 Recovery Plan, and still fluctuates today—some runs suffer almost 50%.

Question: (Tim Ragen) How effective are the fish ladders, and what is the time delay of fish arriving at their bases before migrating further upstream? Are these not perfect grounds for CSLs to exploit?
Response: (Bernadette Graham-Hudson) USACE dams do not have fish ladders; they have adult collection facilities with short entry ladders. Fish passages facilities are at Willamette Falls, though. Passage time through the ladders is variable—it depends on fish locating the entrance or waiting for changes in water temperature.
Response: (Shaun Clements) Because of the nature of Willamette Falls, there would be a delay for fish regardless of whether the hydrofacilities or paper mills were there or not.

Bernadette Graham-Hudson reminded the Task Force that despite the planned mitigation steps and continued monitoring, there were limitations to estimating how much salmonid populations had benefited from certain efforts. For example, given the lack of a robust data set analyzing overall population loss, it is difficult to measure how much habitat restoration, in particular, has aided in salmonid recovery.

She then concluded her presentation and the Task Force turned its attention to Bryan Wright's talk that provided an introduction to the pinnipeds at Willamette Falls.

Pinniped Monitoring and Pinniped/Fishery Interaction at Willamette Falls (Bryan Wright, ODFW)
The main CSL haul-out in the Columbia River basin is located at East Mooring Basin in Astoria, approximately 128 miles downriver on the Columbia River from Willamette Falls and approximately 146 miles downriver of Bonneville Dam. Since 2014, the main pinniped monitoring efforts at Willamette Falls have focused on salmonid predation by pinnipeds but also have expanded to include pinniped abundance and pinniped re-sightings. Methods for these observations have been honed each year as informed by previous data and limited by staff. The total area observed between 2014-2015 covered two portions of the Willamette River: approximately 5.5 hectares of water immediately below the Falls and 36 hectares of the waterway, which included the main CSL haul-out area at Sportcraft Landing, and stopped at the confluence of the Clackamas River. From 2016-2017, this observation area was restricted to the immediate 5.5 hectares below the Falls due to budget constraints and since predation estimates indicated the majority of predation events (60%) were specifically occurring there. Also, as informed by each previous year's data, the observation season was gradually extended due to earlier sea lion presence from March-early June in 2014 to early January-early June in 2017.

Extrapolating from the random sample of observed predation events and number of pinniped sightings, it is possible to estimate the annual number of prey items taken by CSLs. Based on these calculations, from 2014 to 2017 an estimated 85% of prey taken by CSLs at the surface was comprised of salmonids. To corroborate these estimates, feces (scat) and regurgitation (spew) samples (n=49) were collected and analyzed between October 2016 and April 2017; 78% of samples revealed ingestion of non-juvenile salmonids. To be clear, without genetic testing presence of salmonid remains in in scat or

spew does not quantify the exact number eaten (e.g., an otolith would indicate at least one fish, but hundreds of vertebrae could belong to one or multiple fish). Estimated total predation within a six-month time frame in 2017 was calculated using probability-based sampling (specifically three-stage cluster sampling). From 179 observed predation events on salmonids, 2,673 (SE = 518; 95% confidence interval [CI] = 1658, 3688) fish were calculated as having been removed from their respective populations.

Run-specific predation analysis involves observing fish passing the fishway window and tallying the daily percent species composition. These compositions show a predictable pattern with winter steelhead dominating from January-March before summer steelhead, wild, and finally hatchery spring Chinook appear. (2017 data showed delayed arrival for all except winter steelhead, likely due to the colder water temperatures recorded in the river that year.)

Pinniped predation on salmonids observed on a specific day were then probabilistically assigned to a species' run based on the daily composition as estimated from fish ladder data.[1] Similar statistics were applied to estimate the percentage of salmonid runs eliminated by CSLs from 2014 to 2017; these percentages ranged as high as 25% of the run (specifically winter steelhead in 2017). However, it should be noted that even if the CSLs removed a constant number of individual salmon each year, salmonid runs with lower abundances would be impacted to a greater degree and result in a higher estimated predation percentage. Bryan Wright shared a final table showing the latest statistical attempt to make the entire dataset more comparable given the fluctuating observation area as well as the changing observation period and level of observer effort. Additionally, he noted that regular observations of predation at the Falls cease by late May. Based on the 2014-2015 data, he extrapolated that in addition to the estimated 2,673 salmonids taken at the Falls in 2017, 1,615 were also estimated to have been taken in the waterway no longer monitored.

Monitoring of CSLs at Willamette Falls began in 1995 (led by ODFW until 2003 and again from 2014-2017; efforts were led by Portland State University [PSU] from 2009-2012) and has documented a steady increase in CSL sightings. The maximum count on one day in 2017 peaked at 41—an increase from a maximum sighting of ~5 in 2003. The 2004-2008 gaps in the data were due to the CSL situation at Bonneville Dam, when monitoring and removal efforts were focused on that site.

2016 data provided the seasonal curve of estimated sea lion presence, although other observations indicate animals (~5) are arriving at the Falls as early as August of the previous year and remaining in the area until the completion of the runs the following June. Sightings of branded animals have shed light on the duration of time spent at the Falls during the season as well as showing animals returning year after year. Bryan Wright was careful to note that 1) there are many more unbranded animals present that cannot be tracked in this way, and 2) between removals at Bonneville Dam, natural mortality, and the increasing numbers of animals branded each year, statistics for

[1] Run compositions are also pooled into 1, 7, and 14 day periods as time required to traverse through the fish passage are not always known/are inconsistent.

gleaning more concrete or meaningful results are very difficult. For example, while there has been an increase in branded CSL sightings from 19 animals in 2014 to 30 individuals in 2017, animals branded later may have already come to the Falls in previous years without being recorded. Steller sea lion presence was not discussed since this species was not a subject of this application.

Bryan Wright concluded his presentation by briefly sharing a trapping and relocation effort that took place from February-March, 2018. This preliminary effort was put in place to temporarily reduce predation pressure on winter steelhead and served to develop safe trapping procedures for later use. Of the 11 animals trapped, 10 were released south of Newport, OR (1 was part of the Bonneville Dam removal effort and was euthanized per Section 120); most returned to Willamette Falls within 4-6 days.

Discussion:
Bryan Wright's presentation continued on August 21, 2018 (see below for further summary). For the first portion of his talk, however, the discussion revolved around CSL behavior:

> **Question: (Sharon Young)** ODFW had a hazing initiative at the Falls; how did the hazing affect the foraging behavior of the CSLs? When hazing ceased in recent years, was there a marked change in the behavior of the CSLs?
> **Response: (Bryan Wright)** The ODFW's hazing program in 2010, 2011, and 2013 affected foraging behavior by temporarily displacing CSLs from the Falls to areas just downriver, but it likely had no long-term effect on sea lion presence or fish consumption. After 2014, we also emphasized redirecting effort into monitoring over hazing, as that program had proven ineffective at deterring CSLs for extended periods of time.
>
> **Question: (Tim Ragen)** How much do we know about abundances of pinnipeds throughout the whole river system?
> **Response: (Bryan Wright)** We are working on it; I know there are studies in the works from NOAA. Early tags indicated pinnipeds tagged at Bonneville Dam used to transit the river, swimming back and forth between the Dam and Astoria. This pattern has dropped off in recent years. Some more recent data indicates there may be a subgroup of pinnipeds that are remaining in the estuary and exploiting food sources in the lower river instead of traveling as far as the dams. But yes, we are working on abundances.
> **Question: (Liz Hamilton)** Citizen reports from along the Willamette this year are saying predation is extremely prevalent—possibly even on sturgeon?
> **Response: (Bryan Wright)** Yes, 2018 has been a high year for sea lion sightings. We've seen a maximum of 10 Steller sea lions (predominantly preying on sturgeon) foraging further downriver, more than previously recorded.
> **Follow-Up Question: (Liz Hamilton)** Is it possible other species are preyed upon when run abundances for the salmonids are down?
> **Response: (Bryan Wright)** It's possible for CSLs to go after other fish besides salmonids, but the data I have does not suggest that is happening near the Falls; I

would consider it more likely to be misidentification of the type of sea lion in the cases you're describing.
Follow-Up Question: (Liz Hamilton) Have we seen any CSLs entering the Clackamas River?
Response: (Shaun Clements) Yes, there have also been sightings of CSLs in the Clackamas. In 2016 there were up to 6 CSLs at Eagle Creek, approximately 17 miles upriver.

Sharon Young briefly followed up regarding the Steller sea lion abundance, specifically why no application for their removal had been submitted. There have been fewer sightings of Steller sea lions from 2014-2016 at Willamette Falls, however Bryan Wright noted there has been a jump in 2018 and stated it would be prudent to keep their presence in mind should it continue increasing in subsequent years. Shaun Clements contributed that this pattern has been seen at Bonneville Dam and that it could follow that the Steller sea lions may begin preying on salmonids at Willamette Falls as well. An application for Steller sea lion removal would require more well-documented predation data prior to serious consideration.

Population Viability of Upper Willamette River Salmonids
(Matt Falcy, ODFW)
Matt Falcy began his presentation by addressing an earlier topic of conversation among the Task Force: how do we know mitigating the threat of CSLs is important to salmonid recovery when there are multiple other environmental and ecological factors impacting stocks? This question is precisely what his work with modeling attempts to answer: can the threat of salmonid extirpation (local extinction) due to sea lion predation be quantified? To answer this, Matt Falcy would focus on a report analyzing the population viability of winter steelhead. (A similar report on spring Chinook was submitted in June 2018 and will be available at a later date.)

Although a status assessment on winter steelhead in the Willamette River was conducted in 2011, the report did not address the threat sea lion predation would have on the four populations within the tributary basins. A population viability analysis (PVA), or formal predictive model of present and future population levels, was therefore conducted. The life history data for the fish (steelhead abundance, age at maturity, hatchery production, harvest, and predation mortality) informs a number of population dynamics models for these salmonid stocks. After selecting the best-fitting model (i.e., the one which best minimizes prediction error), that model is used to simulate (100,000 times) the population's trajectory over the next 100 years.

Simulations of steelhead populations over the next century in the North and South Santiam, as well as Molalla Rivers, matched the empirical data already collected in terms of variability: modeled populations fluctuated drastically as has been seen in actual spawner counts in the past. The simulated population in the Calapooia, however, rapidly flatlined indicating a volatile population where extended periods (4 or more years) of low spawner abundance meant future recovery was impossible. It is important to note that

these models operate with assumptions (e.g. spawner abundance that will not result in any recruitment the following year), but the assumptions made are conservative.

Based on the model, probabilities of extirpation resulting from added CSL predation were calculated for the North Santiam, South Santiam, Molalla, and Calapooia Rivers. Without CSLs, the risk of extirpation over the next century is as follows: 2% (North Santiam), 5% (South Santiam), 0% (Molalla), and 99% (Calapooia). With low predation rates (based on the lowest observed predation rate seen in 2015), the North Santiam, South Santiam, and Molalla populations face an 8%, 16%, and 0% extirpation risk, respectively; under high predation threat (based on the highest observed predation rate seen in 2017) this jumps to 64%, 60%, and 21%, respectively. The Calapooia's outlook remained unchanged from 99% chance of extirpation, regardless of CSL presence or predation level.

Moving on, Matt Falcy briefly touched on the population viability of spring Chinook. While he used the same PVA methodology as described for steelhead, the time series of abundance is truncated due to the McKenzie River's hatchery-origin spawner abundance not being known prior to 2002. Lacking a robust abundance data set, populations of spring Chinook were compared to one another to garner a better understanding of predation impact: the McKenzie to the Clackamas, and the McKenzie to the Sandy River populations, respectively. This is important given the Clackamas and Sandy River populations are not as likely to experience predation by pinnipeds at Willamette Falls. Although the threat of predation in those populations is not eliminated, the goal was to assess population performance and compare them. The resulting trends in abundance show a declining number of wild spawners in the McKenzie over the next 10-15 years while wild spawners in the Clackamas and Sandy Rivers remain unchanged or increase (based on the geometric mean rate of interannual change).

Matt shared a second calculation of recruits per spawner; here, varying levels of Relative Reproductive Success (RRS) values (1, 0.5, and 0) were assigned to hatchery-origin fish to show if the McKenzie, Clackamas, and Sandy River populations were adequately replacing themselves. Median recruits per spawner in the Clackamas remained stable (0.94, 0.97, and 1.01 for High, Middle, and Low RRS, respectively) while the Sandy River cohort showed a broader range that achieved full 1:1 replacement (0.81, 1.04, and 1.36 for High, Middle, and Low RRS). The outlook for the McKenzie was very bleak with recruit per spawner values of 0.51, 0.65, and 0.89 for High, Middle, and Low RRS.

The final table depicted the extinction risk of the McKenzie spring Chinook population, both without and with CSL predation and at RRS levels from hatchery-origin fish of 1 and 0.5. Without CSL predation and an RRS of 1, the population had between a 23-30% risk of extinction depending on which model was employed, while added CSL predation raised the level to 35-45%. If the RRS was 0.5, a 20-22% chance existed without CSL predation while the addition of predation brought the level to 28-32%. Extinction risks at any RRS level and any CSL predation in the Clackamas and Sandy Rivers did not exceed 1%. He indicated that this PVA was not yet publically available.

Matt Falcy ended his presentation noting that changing to a density-independent model within the PVA would be possible, but that such an analysis would have yielded a gloomier outlook for McKenzie spring Chinook. Overall, the McKenzie is doing more poorly when compared to the Clackamas and Sandy Rivers which show increasing trends, and CSL predation appears to be playing an important role in the McKenzie stock's future.

Discussion:

Immediately following Matt Falcy's presentation, Shaun Clements provided additional context for some of these assessments.

> **Comment: (Shaun Clements)** Keep in mind, that although the Calapooia has a higher percent extinction risk, some populations naturally always do. In this case the risk is due to its small size and habitat. Historically, such smaller (dependent) populations would have been recolonized from nearby larger populations in the event they were extirpated.

Matt Falcy then explained one key point about the models: it is important to keep in mind that the modeled predation rates were kept constant, but anecdotal evidence has already been seen that indicates extirpation rates fluctuate and can actually increase if steelhead spawner abundance is lower for any given year. Even refining the model with new empirical data, as Liz Hamilton asked earlier, will only increase the extirpation risk calculations from the current estimated prediction.

> **Question: (Shaun Clements)** And it's important to keep in mind that although these predation rates are high, we have seen higher rates at Ballard locks as runs decreased-Steve, can you verify that the predation rates on winter steelhead in Ballard Locks were in the 20-60% range?
> **Response: (Steven Jeffries)** Yes, we did see sea lion predation rate increasing over time and this played a significant part in the extirpation of that stock.
> **Additional Response: (Shaun Clements)** That's similar to what we observed 2014-17 at Willamette Falls; approximately the same number of fish are taken each year, but the percentage taken from the run is increased at low run sizes.

The conversation then moved to address the status of the McKenzie:

> **Comment: (Shaun Clements)** Matt's calculations show a poor outlook for McKenzie stock given the baseline. This is also partially due to the time period available for sampling as the analysis is anchored to a high during good ocean years and can only go down from there. The baseline risk is probably lower in reality; regardless, the change between sea lions vs. no sea lions will be the same.
> **Question: (Unknown)** What kind of productivity level would we have to achieve to start reversing this downward trend in the McKenzie and elsewhere?
> **Response: (Matt Falcy)** I haven't run calculations to estimate those. We can see in certain rivers like the Clackamas and Sandy that replacement (1:1 recruit to spawner) is possible with RRS levels at 0.5.

The following comment from Shaun Clements spurred more debate over the efficacy of recovery plans put in motion by these assessments:

> **Comment: (Shaun Clements)** With regard to these extinction risks, what do we think we can realistically do to decrease the percentages? That is a key question to keep in mind for our deliberations. Obviously, there will be things such as climate change that are outside of our control, so we should take those factors into account and shape our recovery approach accordingly.
>
> **Question: (Tim Ragen)** How confident are you that the recovery efforts will actually work, or will they serve more to soothe our consciences in that we are trying to prevent these extirpations?
> **Response: (Shaun Clements)** I am reasonably confident that individual recovery efforts, if implemented, will work. It's a matter of giving these actions some time and gathering the accompanying data, but after implementing many of the recovery plan actions in the Clackamas and Sandy Rivers we've already started turning those populations around.
> **Question: (Tim Ragen)** Then the next concern I have is about the timing of these efforts. How long do you think it will take before you see the effects of reducing CSL predation?
> **Response: (Shaun Clements)** I agree that we won't see everything we want within a short time period—the scope of these actions is too great and it will take time for larger impacts to be seen.

Jinnae Monroe interjected to remind the Task Force that some of these topics could be addressed as additional recommendations put forth together with the Task Force's recommended approval or denial. The conversation was tabled until that time and the Task Force turned its attention to Bob DeLong's presentation on pinniped behavior and ecology.

California Sea Lion Life History, Behavior, Distribution, and Ecology
(Bob DeLong, National Marine Mammal Laboratory)
The US population of CSLs spans the west coast from California, through British Columbia, Canada, and Alaska. Their rookeries are found on islands off the coast of California and the majority of the population returns there during breeding season (May-August) each year. Females are primarily non-migratory and remain offshore of California waters for most of their lives while subadult and adult males can have an extensive range as they forage for food outside of the breeding season.

Despite their large size and known breeding grounds, monitoring and estimating CSL population recovery is not as easy as one might think. Using extensive population data, including 39 years of pup counts from the California Channel Islands and sex- and age-specific survival rates derived from one colony (~45% total population) specifically on San Miguel Island, the abundances of all sexes and ages across the population have been reconstructed. When plotted, the growth curve can be used to estimate the optimal sustainable population, the carrying capacity, and the status of the species.

Currently, the CSL population is at its carrying capacity, having experienced an annual growth rate of 7% as of 2014. In terms of sex and age abundance, an estimated 67,500 (out of 257,000 individuals) were migrant males capable of journeying north into the Columbia River Basin.

The Potential Biological Removal (PBR) has been calculated for the CSL population based on the MMPA: currently, PBR is 9,200 CSL. The term "potential biological removal level" means the maximum number of animals (not including natural mortalities) that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The potential biological removal level is the product of the following factors: a) the minimum population estimate of the stock, b) one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size, and c) a recovery factor of between 0.1 and 1.0. A different analysis put forth by the Pacific Science Review Group suggests a PBR of approximately 7,800 individuals. Yet another, more male-specific calculation yields 3,139 males older than 4 years and 1,647 males older than 8 years as the maximum limits for removal.

Discussion:
The Task Force raised questions that were ultimately tabled for further discussion during deliberations.

> **Question: (Sharon Young)** Can the PBR be adjusted in this way, and if so, is NMFS considering amending it in the Stock Assessment to that fraction of the current PBR?
> **Response: (Tim Ragen)** Human-related mortality is far below the level of making a significant impact at the population level. Under this permit application, animals falling into the removal category will all be male, and we will not be impacting the number of breeders in the population. This is, instead, a humanitarian issue.

MMPA §120(d) Considerations and Benefits Analysis
(Bryan Wright, ODFW)
Bryan Wright followed up on his August 20th presentation by reviewing previous hazing efforts at Willamette Falls as well as highlighting the potential benefits of permanent removal vs. continued hazing. After reminding the Task Force of observed predation and estimated CSL abundances, Bryan Wright discussed data from ODFW's hazing program from 2010-2013. Although the initial hazing effort in 2010 only occurred across 8 days between late March and late April, the effort in 2011 was expanded to occur over 49 days between early February and late April. The 2011 effort exposed 860 CSLs to hazing through a combination of rubber projectiles, shell crackers, and seal bombs (small underwater firecrackers) as deterrents. Two years later, the 2013 hazing effort exposed 1,871 CSLs to hazing over a period of 81 days between early February and late April. Given the increase in the number of CSLs exposed to hazing (while taking into account the lengthier 2013 hazing duration) and the estimated predation by CSLs on salmonids, Bryan Wright moved on to discuss the estimated benefits of permanent removal.

Using a statistical model that assumed a conservative predation rate of 2 salmonids per day per CSL, a CSL residency time of 1-21 weeks, and a salmonid run consisting of 60.8% hatchery spring Chinook, 13.6% wild spring Chinook, 13.7% summer steelhead, and 11.9% winter steelhead, the impact of removing either 46 or 92 CSLs was estimated. By removing 46 CSLs, approximately 3,600-7,600 salmonids would not be consumed, while doubling the removal total to 96 CSLs resulted in approximately 8,400-14,000 salmonids not being preyed upon.

Compensatory Pinniped Immigration
(Bryan Wright, ODFW)
Bryan Wright concluded his presentations by addressing the concept of compensatory immigration in CSLs. Studies looking at land-based predators have given rise to the assertion that culling sea lions may not be effective since terrestrial data indicate removed predators will be replaced by others moving in from a source population nearby. However, he stated that CSLs may not fit the typical model of terrestrial carnivores. Because CSLs at Bonneville Dam and Willamette Falls are migratory, non-territorial, below carrying capacity, and removed from their source population by over 100 miles, the ecological requirements for compensatory immigration are not met. It appears the concept of replacement does not apply.

A recent study using epidemiological models where foraging behaviors for salmonids were transmitted through a sea lion population (similarly to modeling the spread of a disease) though, has suggested timing is key to reducing the overall number of sea lions culled. The model examined the removal data at Bonneville Dam and concluded that had removal begun in an earlier year, the transmission of the behavioral information would have continued but fewer sea lions could have passed the behavior along in following years. Assuming an asocial baseline within the population, any social component increases the chances of existing habituated sea lions. Had fewer sea lions passed along information, it is possible the overall number of CSLs removed would have been substantially lower.

Discussion:
After Bryan Wright concluded his second presentation, the Task Force focused on lethal removal, especially given the presentation of information transmission.

> **Question: (Tim Ragen)** The suggestion is that the CSLs are finding the Falls through exploration or social information transfer. Is there any other factor capable of influencing or limiting the number of animals arriving?
> **Response: (Bryan Wright)** Arrivals do fluctuate. Without additional intervention efforts though, recruitment levels will likely remain high as well as the associated predation.
> **Comment: (Sharon Young)** Given that recruitment is described as occurring from typical exploration and following prey *in addition to* following conspecifics, the secondary assumption that new recruitment will be less if 'x' number of sea lions are removed seems incongruent. Moreover, Steller sea lions are coming to the Falls and they too can be followed by new CSLs.

Response: (Bryan Wright) No, it's true that there is an expected "trickling in" of CSLs to the area, but the numbers should be fewer than if there are returners already habituated to the Falls.
Comment: (Sharon Young) But it follows then that there will always be sea lions to remove, regardless. It becomes cyclical mortality.
Response: (Bryan Wright) Yes, but managing a single-digit cohort in the area over the long-term is more feasible.
Comment: (Sharon Young) Literature describing culling programs states that without clear, measurable objectives, it is difficult to adjust interim take allotments or to even determine if the efforts are successful at all. We need to know there will be benefit from it and historically, most predator control efforts have been ineffective. I am troubled by the fact that what has been presented here seems to hinge on the explanation that the proposed removal cannot hurt the overall CSL population and might alleviate the predation pressure. There should be a clearer justification for the number proposed to be subjected to lethal take, beyond that it will not exceed the a specific percent of the PBR.
Response: (Shaun Clements) I will try to further address those points in my presentation shortly, but to briefly summarize, we have requested the proposed take limit to test a new approach we believe will bring immediate benefit to the salmonids by reducing extinction risk. Our efforts at Bonneville have not been truly successful, largely because of constraints on how removals are conducted; Willamette Falls is an opportunity to modify the approach and gather more data. If this effort does not work, we will have gained more information and will reevaluate. We want to find a solution that will minimize the overall take in the long term.
Additional Response: (Unknown) Part of this is driven by the constraints of the Section 120 brought about by the "individually identifiable" and "significant negative impacts" terminology. The current language would require us to brand as many individuals as possible in Astoria (since ~7% arrive at the Falls later) and then remove as many of them as possible post-arrival.
Question: (Sharon Young) Then with regards to the constraints on the program at Bonneville, are you requesting this Task Force not attach conditions? If Bonneville's requirements constrain too much (i.e. CSL must be seen repeatedly over 5 days, *and* they must be witnessed consuming a salmonid, *and* they must be subject to hazing prior to removal), what will the qualifiers at Willamette Falls look like?
Response: (Shaun Clements) We proposed the following conditions: the CSL must be seen repeatedly in the area over a 3-day time span *OR* seen consuming a salmonid before it qualifies for removal. We think this is an effective way of rapidly driving the population down.

Further discussion of this topic was tabled until after the final presentation and deliberations. The Task Force then addressed the logistics of future removals.

Question: (Bob DeLong) How are we proposing to remove them?

Response: (Bryan Wright) Our 2018 effort involved setting traps at the Sportcraft Marina (a common haul-out spot). After some trial and error, we've more ideas on how to better persuade sea lions into our traps.
Additional Response: (Unknown) Our traps are similar to those used at Bonneville Dam and elsewhere: floating platform traps capable of connecting to transfer cages on barges. The barge is equipped with a squeeze cage designed to safely restrain an animal for blood draws, tagging, biopsies, etc if desired. Otherwise the animals would be transported to a secure work area where veterinarians would oversee euthanasia (using sodium pentabarbitol or another approved drug).
Additional Response: (Bryan Wright) The current secure facility is at Bonneville; this may change in the future so long-distance transportation is not necessary.
Follow-Up Question: (Bob DeLong) How many do you think you could process like that in one summer?
Response: (Bryan Wright) In terms of effort, we had 11 animals captured over 5 weeks of trapping. There were fewer than 15 animals total in the vicinity at the time (Feb-Mar). A theoretical maximum for this site would probably be 6-9 animals per week.
Additional Response: (Shaun Clements) Currently, we do not have the resources to operate removal programs at both Willamette Falls and Bonneville Dam.
Additional Response: (Robert Anderson) Any further actions will have to stipulate that operations receive proper funding and staff.

Given the specificity of the questions being asked, the Task Force opted to resume discussions on these topics during the deliberations.

Are California Sea Lions Causing Undue Injury to Salmonids or Humans? (Shaun Clements, ODFW)
Shaun Clements then addressed the severity of sea lion impact on salmonids and humans. Models suggest sea lion predation is playing a significant role in the overall survival of Willamette River salmonids. Through these extinction risk estimates, we have identified a threat that, upon removal, could drop probabilities of extirpation dramatically. The example of the winter steelhead risk in the North Santiam falling from 64% to 2% without CSL predation is telling. Although it is understood that multiple factors impact salmonid survival, mitigation of these sorts of additional factors will take more time. Therefore, the application put forth by the state has requested authorization to lethally remove 92 CSLs in an effort to quickly relieve pressure on the fish populations from this particular factor. Removing this number of CSLs is not expected to negatively impact the CSL population and remains far below the 1% PBR mark.

CSLs are currently at or near carrying capacity; their population has rapidly recovered since the 1970s and we expect their population to hover between 250,000-300,000 for the foreseeable future. There are currently a minimum of 40 CSLs at Willamette Falls; some of them have increased their residency times from 3 months per year to nearly 10 months

per year. These individuals have learned and adapted to the readily available food source at the Falls as approximately 85% of their diets are composed of salmonids.

Non-lethal management efforts have included monitoring and hazing programs. Despite these programs, CSLs are still arriving at Willamette Falls—some as early as August and building into the peak period from April-May. While some transmission of this foraging information among individuals is expected, the base population that has established itself at the Falls increases the likelihood that more CSLs will enter the area over the next few years. This type of recruitment has already been witnessed at the Bonneville Dam. Willamette Falls can therefore act as a test, where earlier removal of CSLs may decrease the information transmission rate and result in fewer animals removed overall.

Maintaining a non-lethal hazing operation following lethal action to prevent re-establishment may have its merits, however, there is little evidence to support the idea that the CSLs around Willamette Falls are naïve, having happened across these foraging grounds by chance, and therefore easily chased away. Aside from the rapid adaptation of CSLs to hazing efforts, there is also the question of practicality since the manpower required for prolonged hazing operations is unsustainable. If the long-term resident CSL number is held close to zero and the number of recruited animals also is reduced, non-lethal hazing operations at a smaller scale may be worth considering in the future.

In conjunction with any lethal removal, the effectiveness of the action would be assessed through three main avenues:

(1) has predator presence from November-March been reduced,
(2) has the maximum daily predator sightings in April-May been reduced, and
(3) has the predation rate at the Falls been reduced?

Discussion:
The Task Force initially asked for clarification of two points: the number of CSLs designated for removal and the time period in which removals could occur.

With regard to the number listed in the application (92), Shaun Clements clarified this was to be per year of the removal program being active. He stated that while it is not realistic to assume we could remove this many animals in a year, removal of all animals at the Falls would be the goal. He did not provide information as to how the number 92 had been selected and justified.

As to the time period during which removals could occur, Sharon Young pointed out that the state's application requested a 10-month control period. The proposed evaluation period described in the presentation only documented predation for seven months (November through May) with observations at the Falls only documented for five. To clarify, Shaun explained that CSLs have been seen arriving as early as August and staying through the next nine months. If the goal is to impact predation occurring earlier during runs, removing the animals in August as opposed to waiting three months before

taking action seems prudent. Hence, a lethal control period of August through May has been requested.

The next issue addressed touched on the levels of impact from the various factors aside from sea lion predation:

> **Question: (Tim Ragen)** How much variation in the salmonid populations can we explain by other factors aside from pinniped predation, and can more be done to address those other factors in such a way that pinniped predation is negated and/or removal may not be necessary?
> **Response: (Shaun Clements)** Yes, there are many factors impacting the populations and there are many ongoing efforts to mitigate those other problems. There are partial datasets that breakdown how specific factors impact survival, and there are predicted recovery rates for each in the management plan.
> **Comment: (Tim Ragen)** If we have to set an immediate number of sea lions to remove, there should also be more rigorous assessment of the effect and more effort made to expedite the passage of the fish migration.
> **Response: (Shaun Clements)** That is a valid point; however, there are certain environmental cues that we cannot control that inevitably lead to fish holding for longer in areas where they are prone to predation.

A final exchange highlighted the complexities surrounding the issue of authorizing CSL removal from the area:

> **Comment: (Tim Ragen)** Evaluating the effectiveness of sea lion removal should focus on the response of the salmonid populations. Removing a specific number of sea lions each year is less powerful without quantitative salmonid population data showing signs of recovery.
> **Response: (Steven Jeffries)** Many other factors outside of human control/management efforts can impact run sizes more than predation by CSLs (e.g. ocean conditions). Nonetheless, predation rate and predation days are therefore solid metrics, especially if the predation threat is reduced in the early portions of salmon runs.
> **Comment: (Tim Ragen)** Yes, there are many factors impacting the survival rate, and it seems reasonable to continue monitoring salmonid survival as it relates to those other threats, too. It could be that sea lions are becoming a larger danger now if salmonid abundances are already decreasing in response to continued land or hydropower development. If we want to examine CSL predation, we should not exclude the rest of the ecological system or remaining interspecies interactions when considering relative contributions to extinction risk.

Considerations and Deliberations

Following all presentations, the Task Force began deliberations and assessed where and what types of recommendations/alternatives were warranted.

Section 120(d) Considerations:

> *(a) Population trends, feeding habits, the location of the pinniped interaction, how and when the interaction occurs, and how many individual pinnipeds are involved;*

Within Section 120(d)(a)'s considerations, the Task Force began discussing the concern that a specified number of individually identified CSLs could not be guaranteed to be at the Falls from year to year.

> **Comment: (Sharon Young)** This estimate of sea lions is actually a broad range given that monitoring at the Falls and tracking of individuals only takes place during a small portion of the year, and the fact that Steller sea lions are also arriving at the Falls to prey on the fish.
> **Response: (Shaun Clements)** The minimum number currently hovers at 40 CSL individuals, and the estimated range lies between 40-100 individuals.
> **Comment: (Sharon Young)** You cannot necessarily project that killing animals at the proposed level will stop predation, when more animals will continue arriving. This is an open-ended system easily located, similar to Bonneville Dam. Elimination of the identified number of predators does not change that fact.
> **Response: (Sara LaBorde)** The issue of replacement is separate, though; we have a minimum of 40 and maximum of 100 animals. Compensatory immigration or replacement of individuals comes into play after removals have actually occurred.
> **Response: (Liz Hamilton)** I believe the application does address knowledge gained from Bonneville Dam. All of our efforts at Bonneville allowed the problem to grow instead of curtailing it. This application is improved because it has incorporated what we have learned from Bonneville.

The conversation then turned to predation rates outside the Willamette River:

> **Question: (Tim Ragen)** What do we know about the predation rates in the LCR and LWR? Are there choke points where fish are stalling and easily preyed upon? And if so, what is being done to address the choke points?
> **Response: (Shaun Clements)** Robin Brown provided an estimate to Congress documenting 20-25% predation rate, although again, there are many factors at play. We do not believe, though, that managing CSLs in the estuary and lower rivers is the proper approach.
> **Additional Response: (Sharon Young)** That estimate of predation rates, and even higher estimates, are based on presentations and an unpublished and non-peer reviewed paper by Michele Rub et al. looking at disappearance of radio tagged fish prior to reaching Bonneville Dam; it is therefore not reliable data in this instance.
> **Additional Response: (Unknown)** We assess passageway efficiency to prioritize our efforts and constantly reevaluate as technology improves. In this case, we have good data that indicates a possible path forward. Beyond that, perfect data or

perfect confidence in an approach is impossible. In some cases, like habitat restoration, it may take 20 years to see the full benefit of the work we've done and are doing. But in the case of direct mortality, though, that is something we can influence immediately.

Additional Response: (Shaun Clements) Given the different migration timing of spring Chinook and winter steelhead, there is nothing unnatural to their delaying migration in some years. Our only method of increasing migration in certain spots is to control flow rates and temperatures, but that is not within the scope of this application.

Comment: (Tim Ragen) Previous studies in the 1970s concluded hydroelectric dams were one of the most environmentally damaging forms of power generation. I would like to know that this history is kept in mind and incorporated into any long-term approaches.

Response: (Liz Hamilton) Yes, but no one here is saying this is an *either, or* situation: it is a *yes, AND* situation. All these approaches have to and will continue.

Resource Advisors as well as a study collaborator described the newer research regarding lower river predation. They stated that the 2011 study (originally mentioned by Sharon Young) has since been expanded, is currently under review for publication, and has been documenting predation occurring in the LCR and LWR. Preliminary data estimated there is up to 43% mortality, some of which would have been attributed to predation. The lowest annual mortality was 14% and seemed to fluctuate with CSL presence. The augmented study used radio tagging between Astoria and Bonneville and documented predation occurring in mid-water reaches, which supported the documented fish loss and explained lack of observed predation. Further data from hot tags in fish corroborate that there is predation by pinnipeds. Although the expanded study does not yet have a statistically powerful sample size, it is ongoing. Future conclusions can be drawn when the dataset is more complete.

Final Comment: (Robert Anderson) Obtaining specific data will be beneficial, but it is outside the scope of this particular meeting. We know predation is occurring and is of concern at Willamette Falls. Provided the Task Force members have a good understanding of information available, the application provides a range of predation at the Falls. For the time being, we will have to cope with the inherent uncertainty while recognizing these are the best data at the moment. Ultimately, the range described in the application was deemed sufficient and data collection will continue as monitoring techniques are improved.

(b) Past efforts to non-lethally deter such pinnipeds, and whether the applicant has demonstrated that no feasible and prudent alternatives exist and that the applicant has taken all reasonable nonlethal steps without success;

Meagan West, Sara LaBorde, and Shaun Clements all stated they felt the applicant had sufficiently shown no non-lethal alternatives remain, especially when trapping and relocation efforts resulted in the majority of animals returning to Willamette Falls within

a month (at the latest). Some members, however, felt that retaining non-lethal methods as an option was warranted:

> **Comment: (Tim Ragen)** While I agree there is no feasible alternative for deterrence, I would like to see more clarity since some hazing studies have shown "hit or miss" results. I do not believe hazing should be discounted entirely.
> **Additional Comment: (Bob DeLong)** Remember, Shaun described the possibility of other methods being made available once the initial removal process is complete. That is an informed path forward that I think we should endorse. We will not always know how these actions will play out in new situations and having the flexibility to reevaluate is reasonable.
> **Additional Comment: (Paul Ward)** It is important to remember that these operations do not come without cost. For example, we lost someone due to weather conditions 18 months ago during a hazing operation.
> **Final Question: (Unknown)** Would it be possible to not have hazing as a requirement of the permit, but retain the option if it is necessary at a later date?

The Task Force generally agreed to keep non-lethal methods in mind for use on naïve animals) once long-term resident CSLs have been removed. The majority of the Task Force felt that the application had sufficiently documented that no feasible alternative remains and the majority felt that lethal removal was an appropriate course of action.

> *(c) The extent to which such pinnipeds are causing undue injury or impact to, or imbalance with, other species in the ecosystem, including fish populations;*

The majority of the Task Force concluded the data demonstrated predation by CSLs was a threat to salmonid populations. There were some concerns, however, on the degree to which CSLs were a threat requiring lethal action:

> **Comment: (Sharon Young)** Data on the status of salmonid runs were presented clearly and the population monitoring methodology is sound, however it does not follow that CSLs alone are having a notable and deleterious effect that requires lethal intervention. Additionally, CSL removal is not a clear solution. We have only to look to the Bonneville Dam situation for proof of that.
> **Response: (Unknown)** There is no doubt salmonids are at risk, but contextually this is a problem caused by many factors. Pinnipeds are not the sole problem and it is vital we consider the larger ecosystem.
> **Additional Response: (Unknown)** No one has said pinnipeds are the sole cause, but they are contributing to potential reproduction and subsequent recovery of salmonid stocks. The state of Oregon is saying it is a factor that is potentially significant. Sea lions arrived at Bonneville in the early 2000s and had not been taking fish prior to that. Any new source of mortality could trigger some action. We see that here at Willamette Falls quite clearly, especially with regards to the steelhead. If pinniped predation weren't limited in a substantial way, would there be steelhead left? I don't know. With regards to compensatory immigration, I do find it difficult to believe an animal will be replaced immediately after removal.

Ultimately, we understand this action is not a panacea—it is one thing we can do to address one factor. If the state is able to remove a few dominant predators, they may not need to remove any the next year. But it is clear this is an ongoing management effort.
Comment: (Sharon Young) Given the earlier discussion about early intervention, it is striking the application did not address removal of Steller sea lions who are also present and prey on salmonids. We know from the Bonneville Dam that their presence started out very small and they now outnumber CSLs during some monitoring days.
Response: (Shaun Clements) The current law only allows for removal of pinnipeds that are impacting salmon or steelhead. We have no data to show they are having a negative impact on steelhead. They have primarily preyed on sturgeon (a non-protected species) in the past. In the event Steller sea lions do begin preying on salmonids, an application for their removal would be submitted.

(d) The extent to which such pinnipeds are exhibiting behavior that presents an ongoing threat to public safety.

The Task Force briefly discussed this matter since some members, including Meagan West, felt it had not been adequately addressed through earlier presentations. She stated that her members who are active fishermen reported seeing sea lions throughout the harvest season and needing to modify release methods (e.g. using modified poles instead of nets). Ultimately, they concluded this is a public safety issue, but may be one more appropriately addressed through outreach and educational efforts.

NMFS' Expectations of the Task Force

NMFS also requested the Task Force respond to the following questions when preparing its recommendations:

(1) If lethal removal is included in the recommendations, what (if any) additional criteria, in addition to the criteria proposed by the state in their application, does the Task Force recommend that would improve the effectiveness of the lethal removal program?

The Task Force primarily focused on addressing the "individually identifiable" terminology, improved methodologies to identify animals, and the time period over which a CSL would need to be observed to qualify for removal. Initial discussions raised recommendations to continue monitoring throughout the removal process to have clear 'before' and 'after' datasets, using facial recognition technology to identify individuals through photographs, and stating CSLs would need to be observed at least twice across a number of individual days. Following deliberations and verifying the feasibility of some discussed recommendations some of the Task Force members submitted the following two recommendations for consideration:

- The Task Force believes that, in this case, the data collected within the scope of the application supports identifying California sea lions for removal based on their presence between the mouth of the Clackamas River and Willamette Falls.
- The state's application included the following qualifier for a predatory CSL: "They have been observed between Willamette Falls and the mouth of the Clackamas River on a total of **any three calendar days** (consecutive days, days within a single season, or days over multiple years) between November 1 and August 15 of any year." The Task Force suggests changing the wording in application to: "…**any two calendar days**" instead.

(2) If lethal removal is included in the recommendations, does the Task Force recommend a limit (different that the limit proposed by the state in their application) to the number of sea lions that may be removed, and if so what is the justification for that limit?

Discussion ensued as to whether the current limit proposed by the applicant was sufficient; ideas were put forth that 1) revolved around attaching a monitoring and notification stipulation should the number removed approach the upper limit yet predation was still continuing or 2) modifying the overall percentage of PBR that could be lethally removed under the permit. Ultimately though, no additional recommendations were put forth by the Task Force for Question #2.

(3) If lethal removal is included in the recommendations, what limitations (if any) would the Task Force recommend on timing, location, take methods or duration of the authorization?

After confirming the proposed approach and removal methods were the same as those currently used at Bonneville Dam, the Task Force discussed options for removal itself. As NOAA has accepted the option of relocating trapped animals to US zoos and aquaria before, keeping this option available was favored. Additionally, there was discussion that capture success in traps at Willamette Falls has varied and some concern was expressed over improving removal efficiency. However, given that the efforts have only been employed for a few weeks, there is some room for trial and error to hone capture techniques. Following more discussion, though, no specific recommendations were put forth by the Task Force for Question #3.

(4) There are various proposed pieces of legislation to amend Section 120 of the MMPA (e.g., HR 2083, S 1702, S 3119) in Congress. Of particular interest are the proposed modifications to the individually identifiable and significant negative impact criteria. Our initial assessment of the proposed legislation as it relates to these two criteria, is that measures for identifying predatory sea lions via branding, natural features, etc., and documenting predation to determine its impact on salmonid fishery stocks, would no longer be required. Instead, identification of sea lions for removal would be based on a geographic criterion, so that any sea lion within a specified geographic area, e.g., above river mile 112 on the Columbia River, or a tributary to the Columbia River that includes

spawning habitat of threatened or endangered salmon or steelhead, would be deemed eligible for removal.

Therefore, we are asking the Task Force to provide us with their views regarding the proposed modifications to the individually identifiable and significant negative impact criteria, and include those considerations in your recommendations to NMFS.

The Task Force debated for some time regarding how passing of these pieces of legislation would impact the outcome of this meeting. Of concern to many on the Task Force was that Task Force work would be disregarded or not deemed relevant in the event an amendment to the MMPA was passed addressing predation in these rivers. A reasonable solution was proposed to reconvene via conference call to make adjustments if needed.

Comment: (Doug Hatch) Given the process and effort of this Task Force and the combination of everyone's expertise to develop a set of recommendations to address recovering fish stocks—to start over again if legislation changes would be tough.

The removal of sea lions from within a geographic range as opposed to solely individually identifiable animals had been discussed by the Task Force during the assessment of Question #1 and was seen by most of the Task Force as an improvement. However, the Task Force took no position on the specific bills in congress and put no additional recommendations forth for Question #4.

(5) If NMFS approves the state's application, what criteria does the Task Force recommend for evaluating whether the implementation of the lethal removal program has been successful in addressing the pinniped—fishery interaction?

After discussion of monitoring and evaluation, there was broad agreement among Task Force members that NMFS adopt the following six criteria to evaluate the effectiveness of any implemented lethal removal program:

- Monitor, evaluate implementation, and report on specific animals observed, when they were removed, and time spent at the Falls.
- Monitor and report on the number of prey observed and estimated to have been taken.
- Monitor, evaluate, and report on expediency (number of days animal present before removal) of removal.
- Monitor and report on key population parameters for the Chinook and steelhead populations so that changes in population status can be detected.
- Ensure that monitoring efforts include other pinnipeds that may occur in the Willamette Falls area.

- Update PVA analyses after 5 years of implementation to determine, to the extent possible, any changes in the estimated extinction risk to the salmonid stocks in question.

(6) Regardless of the outcome of this process, what might be the most effective means to achieve a long-term resolution to the pinniped—fishery interaction?

Regarding a long-term resolution to pinniped-fishery interactions, discussions continued around how best to achieve a full recovery of the salmonid stocks. Human impact on the environment was pointed out as the largest contributor, particularly given the history of dam development. Proactive and multi-pronged management, in addition to balanced stewardship, was described as the overarching goal. No specific recommendations were suggested, though, with regards to Question #6.

Public Input

Only one member of the public, Gary Wisse, was present on the first day and called into the conference line on the last day of the Task Force meeting.

Additional Input

Clifford Owen, an ODFW employee and member of the field crew that conducted the 2017 Willamette Falls Pinniped Monitoring Program, asked these questions:

Question: (Clifford Owen) Given the low reproductive success of winter steelhead, would removal of pinnipeds even at this juncture be enough to see a natural recovery of the population?
Response: (Shaun Clements) I'm not sure from where you are citing the low reproductive success. The PVA analysis shows variable spawner recruit values but there tends to be more productivity when the abundances are lower and resources aren't as constrained by competition. At this point, we do not believe that the populations are so low that recovery is impossible.
Follow Up Question: (Clifford Owen) Has it been taken into consideration that the core group of pinnipeds and their influx into the Willamette River may be coinciding with the hatchery release schedule? In other words, could they be responding to a human-created food source?
Response: (Shaun Clements) Pinnipeds are arriving during periods when there are only wild fish and are targeting exclusively wild fish during these periods. The hatchery spring Chinook run does not begin until April at which time there are already several sea lions onsite. Obviously, our desire is to reduce hatchery production as recovery efforts result in healthy wild fish populations. But ultimately, hatchery fish or wild, we would prefer the pinnipeds not eat any of them.

Summary and Final Vote

Support For/Opposition To Recommendations:
Question #1: If lethal removal is included in the recommendations, what (if any) additional criteria, in addition to the criteria proposed by the state in their application, does the Task Force recommend that would improve the effectiveness of the lethal removal program?

The Task Force had proposed the following two recommendations:

- The Task Force believes that, in this case, the data collected within the scope of the application supports identifying California sea lions for removal based on their presence between the mouth of the Clackamas River and Willamette Falls.
- The Task Force suggests changing the wording in application to: "…any 2 calendar days" instead of 3.

With regard to Question #1's first recommendation, fourteen (14) Task Force members approved, one (1) opposed (HSUS) and one (1) abstained (USACE).

Discussion regarding Question #1's second recommendation resulted in fourteen (14) Task Force members approving while two (2) members abstained (USACE and HSUS). No opposition was voiced.

Question #5: If NMFS approves the state's application, what criteria does the Task Force recommend for evaluating whether the implementation of the lethal removal program has been successful in addressing the pinniped—fishery interaction?

The Task Force had proposed the following six recommendations:

- Monitor, evaluate implementation, and report on specific animals observed, when they were removed, and time spent at the Falls.
- Monitor and report on the number of prey observed and estimated to have been taken.
- Monitor, evaluate, and report on expediency (number of days animal present before removal) of removal.
- Monitor and report on key population parameters for the Chinook and steelhead populations so that changes in population status can be detected.
- Ensure that monitoring efforts include other pinnipeds that may occur in the Willamette Falls area.
- Update PVA analyses after 5 years of implementation to determine, to the extent possible, any changes in the estimated extinction risk to the salmonid stocks in question.

Given these recommendations focused on conducting further research, fifteen (15) Task Force members approved of these points; one (1) member abstained (USACE). No opposition was voiced.

Vote on State's Application:
With regard to the state's application, the Task Force was asked whether to:

(A) recommend to the Secretary whether to approve or deny the proposed intentional lethal taking of the pinniped or pinnipeds, including along with the recommendation a description of the specific pinniped individual or individuals, the proposed location, time, and method of such taking, criteria for evaluating the success of the action, and the duration of the intentional lethal taking authority; and

(B) suggest nonlethal alternatives, if available and practicable, including a recommended course of action.

The vote on the state's application was considered both "as-is" and "with the following modifications" suggested by some of the Task Force members:

Question #1:

- Does the Task Force believe that, in this case, the data collected within the scope of the application supports identifying California sea lions for removal based on their presence between the mouth of the Clackamas River and Willamette Falls.
- Does the Task Force suggest changing the wording in application to: "…any 2 calendar days" instead of 3.

Question #5:

Does the Task Force support a recommendation to:

- Monitor, evaluate implementation, and report on specific animals observed, when they were removed, and time spent at the Falls.
- Monitor and report on the number of prey observed and estimated to have been taken.
- Monitor, evaluate, and report on expediency (number of days animal present before removal) of removal.
- Monitor and report on key population parameters for the Chinook and steelhead populations so that changes in population status can be detected.
- Ensure that monitoring efforts include other pinnipeds that may occur in the Willamette Falls area.
- Update PVA analyses after 5 years of implementation to determine, to the extent possible, any changes in the estimated extinction risk to the salmonid stocks in question.

Voting on the Application Submitted As-Is
Nine (9) Task Force members voted to approve the state's application as-is, one (1) Task Force member voted to deny the state's application (HSUS), and six (6) Task Force members abstained including those from ODFW and NMFS.

Voting on the Application Submitted With Modifications
Twelve (12) Task Force members recommended approving the state's application with modifications. One (1) Task Force member voted to deny the state's application (HSUS) on grounds that despite further research emphasized in the modifications, the lethal removal action itself was not merited. Three (3) Task Force members abstained (USACE, ODFW, and NMFS).

Following the vote, Robert Anderson and Jinnae Monroe thanked the Task Force members for their participation in the meeting and the conference was adjourned.

[Facilitator's Note: This report was compiled by Write Brain LLC's facilitation team. Jinnae Monroe acted as meeting facilitator; Marie Rowland took notes and transcribed, while Andrea Schlunk wrote the summary and final report. Task Force members provided edits on a first draft and were allowed a second review of a "near final" draft prior to submission.]

Final summary respectfully submitted on October 15th, 2018.