

**ANNUAL PROGRESS REPORT FOR THE 2014
FALL CHINOOK SALMON CONSERVATION PLAN
ROGUE SPECIES MANAGEMENT UNIT
OREGON DEPARTMENT OF FISH AND WILDLIFE
ROGUE WATERSHED DISTRICT**

INTRODUCTION

In January of 2013, the Oregon Fish and Wildlife Commission formally adopted a conservation plan for fall Chinook salmon in the Rogue Species Management Unit (SMU). This plan calls for the Oregon Department of Fish and Wildlife (ODFW) to complete annual reports that will include, at least, the following elements: (1) SMU status in relation to the desired status and conservation status statements embedded in the conservation plan, (2) summaries of annual efforts to monitor SMU attributes, (3) implications of any research or evaluation projects completed during the reporting year, (4) any updated assessments of population attributes completed during the reporting year, and (5) presentation of the rationale associated with any changes in management actions made during the reporting year.

This report summarizes the status of the SMU in relation to desired status and conservation status through the 2014 return year, completed management actions, and 2015 preseason forecasts in relation to conservation status and maximum sustained yield (Chetco, Winchuck).

A copy of the conservation plan, and annual progress reports, is available on the ODFW website at:

http://www.dfw.state.or.us/fish/CRP/rogue_fall_chinook_conservation_plan.asp

SUMMARY OF SMU STATUS

Two population strata compose the SMU: (1) the Rogue stratum and (2) the coastal stratum. The two strata are differentiated by life history and genetic differences within the constituent independent populations of naturally produced fall Chinook salmon (NP CHF). Where possible, status criteria were developed for each independent population monitored by ODFW.

Populations in the Rogue stratum are monitored as an aggregate by sampling at Huntley Park near the mouth of the Rogue River, except that NP CHF in the Lower Rogue population area are also monitored annually by ODFW.

Monitoring of SMU attributes is designed to produce metrics that are to be used to characterize the current status of the SMU. All monitoring needed to update SMU status was completed by ODFW in 2014, and the results are included in tables 1 and 2. Monitoring results that most differed in 2014, as compared to previous years, include significantly reduced escapement in the Rogue Aggregate population, and above average escapement in the Pistol population. The Winchuck population also increased substantially as compared to the very low escapement in 2013.

Table 1. Comparisons of singular elements of current and desired status for naturally produced fall Chinook salmon in the Rogue Species Management Unit. Desired status criteria are described in the conservation plan, and both metrics cover the most recent ten year period. Underlined metrics of current status did not meet desired status criteria.

Status Element	Desired Status	Current Status	2014 Estimate
ROGUE AGGREGATE POPULATIONS			
Adult Abundance ^a	≥54,400	<u>54,095</u>	53,518
Age Structure ^b	≥10%	10%	10%
Run Timing ^c	≥8%	8%	8%
Run Composition ^d	≤5%	5%	4%
LOWER ROGUE POPULATION			
Adult Abundance ^e	≥3,500	6,215	5,615
Spawner Composition ^f	≤10%	3%	3%
CHETCO POPULATION			
Adult Abundance ^e	≥3,800	<u>3,499</u>	5,474
Age Structure ^h	≥16%	16%	9%
Spawner Composition ^f	≤18%	12%	10%
WINCHUCK POPULATION			
Adult Abundance ^e	≥1,000	<u>892</u>	1,036
Juvenile Abundance ^g	≥125,000	150,321	99,927
Spawner Composition ^f	≤10%	4%	4%
PISTOL POPULATION			
Adult Abundance ^e	≥1,300	1,404	2,869
Spawner Composition ^f	≤5%	2%	0%
HUNTER POPULATION			
Adult Abundance ^e	≥560	635	1,057
Spawner Composition ^f	≤5%	1%	0%

^a Number of age 3-6 NP CHF that pass Huntley Park.

^b Relative abundance of age 5+6 fish among NP CHF that pass Huntley Park.

^c Relative abundance of October migrants among NP CHF that pass Huntley Park.

^d Relative abundance of hatchery fish among CHF that pass Huntley Park.

^e Number of NP CHF spawners.

^f Relative abundance of hatchery fish among CHF spawners.

^g Number of juvenile NP CHF produced in areas upstream of the South Fork.

^h Relative abundance of age 5+6 fish among NP CHF spawners.

Table 2. Status of the Rogue Fall Chinook Salmon Species Management Unit as compared to conservation criteria. Conservation status criteria are described in the conservation plan and cover, unless otherwise noted, the most recent three year period. Underlined metrics of current status did not meet conservation status criteria.

Status Element	Conservation Criterion	Comparative Status	2014 Estimate
ROGUE AGGREGATE POPULATIONS			
Adult Abundance ^a	<20,400 ⁱ	67,587	53,518
Age Structure ^b	<3%	6%	10%
Run Composition ^c	<5%	6%	8%
Run Composition ^d	>10%	4%	4%
LOWER ROGUE POPULATION			
Adult Abundance ^e	<1,500	4,636	5,615
Spawner Composition ^f	>15%	5%	3%
CHETCO POPULATION			
Adult Abundance ^e	<1,440 ⁱ	4,233	5,474
Age Structure ^h	<5%	12%	9%
Spawner Composition ^f	>20%	12%	10%
WINCHUCK POPULATION			
Adult Abundance ^e	<300 ⁱ	692	1,036
Juvenile Abundance ^g	<50,000 ^j	99,927	99,927
Spawner Composition ^f	>15%	4%	4%
PISTOL POPULATION			
Adult Abundance ^e	<540	1,694	2,869
Spawner Composition ^f	>10%	0%	0%
HUNTER POPULATION			
Adult Abundance ^e	<300	1,047	1,057
Spawner Composition ^f	>10%	0%	0%

^a Number of age 3-6 NP CHF that pass Huntley Park.

^b Relative abundance of age 5+6 fish among NP CHF that pass Huntley Park.

^c Relative abundance of October migrants among NP CHF that pass Huntley Park.

^d Relative abundance of hatchery fish among CHF that pass Huntley Park.

^e Number of NP CHF spawners.

^f Relative abundance of hatchery fish among CHF spawners.

^g Number of juvenile NP CHF produced upstream of the South Fork.

^h Relative abundance of age 5+6 fish among NP CHF spawners.

ⁱ Criteria are based on a running two year average.

^j Criterion covers every year.

COMPLETED MANAGEMENT ACTIONS - ROGUE STRATUM

The Oregon Fish and Wildlife Commission adopted Rogue Alternative 4, outlined in the conservation plan, as the preferred suite of management strategies to be employed by ODFW. Some of the relevant actions, completed by ODFW during 2014, are briefly discussed below. A tabulated progress summary related to management actions described in the conservation plan is included in Table 4.

Management Strategy 4.1

Many of the actions within Management Strategy 4.1 relate to seasonal operations of Lost Creek and Applegate reservoirs by the United States Army Corps of Engineers (USACE). ODFW worked cooperatively with the USACE to identify and implement reservoir release strategies designed to enhance naturally-produced fall Chinook (actions 4.1.1, 4.1.2, 4.1.4, 4.1.5, 4.1.6, 4.1.7, 4.1.9). A weekly conference call, implemented in 2013 to facilitate communication, was continued in 2014. ODFW participated in the USACE annual winter management coordination meeting.

Average flow at the Agness gage was maintained at 2,023 cfs August 18 – September 15 (action 4.1.7). Flow augmentation for adult fall Chinook was delayed until August 18 because the first significant movement of fall Chinook past Huntley Park occurred on August 18. Disease-related mortality of adult fall Chinook in 2014 was estimated at 11%. Mortality estimates are derived from flow-based models. Additional management actions would be triggered if disease-related losses were forecast to reach 40% (action 4.1.8).

The minimum flow needed to protect juvenile fish rearing in the mainstem in summer is 1,000 cfs as measured at the Grants Pass gage. The flow in 2014 exceeded this level, averaging 1,550 cfs at Grants Pass July 1 – August 17 (action 4.1.9). The lowest average daily flow during the period was 1,410 on July 18.

ODFW participated in a variety of habitat protection activities (action 4.1.14), including review of water right applications, removal/fill applications, and compliance monitoring of municipal and county riparian ordinances.

Management Strategy 4.2

ODFW's Aquatic Invasive Species program deployed two watercraft inspection crews in the Rogue Watershed District in 2014 (action 4.2.1). Crews based in Central Point and Gold Beach conducted boat inspections, primarily on the I-5, Hwy 97, and Hwy 101 corridors, from late spring through early fall.

Management Strategy 4.3

The minimum flow needed to protect juvenile fish rearing in the mainstem in summer is 1,000 cfs as measured at the Grants Pass gage. The flow in 2014 exceeded this level, averaging 1,550 cfs at Grants Pass July 1 – August 17. Lower water temperatures in downstream areas, as a result of the increased flow, result in fewer predation losses because of decreases in pikeminnow metabolic rates (action 4.3.2), using storage that is not needed to protect adult spring Chinook and adult fall Chinook.

Management Strategy 4.4

Zone regulations were employed in 2014 because fall Chinook escapement was forecasted to exceed escapement goals related to conservation criteria (action 4.4.1).

Management Strategy 4.5

ODFW did not complete any work specific to Management Strategy 4.5 in 2014.

COMPLETED MANAGEMENT ACTIONS - COASTAL STRATUM

The Oregon Fish and Wildlife Commission adopted Coastal Alternative 6, outlined in the conservation plan, as the preferred suite of management strategies to be employed by ODFW. Some of the relevant actions, completed by ODFW during 2014, are briefly discussed below. A tabulated progress summary related to management actions described in the conservation plan is included in Table 5.

Management Strategy 6.1

ODFW participated in a variety of habitat protection activities (actions 6.1.2, 6.1.8), including review of water right applications, removal/fill applications, and compliance monitoring of municipal and county riparian ordinances.

Management Strategy 6.2

ODFW's Aquatic Invasive Species program deployed two watercraft inspection crews in the Rogue Watershed District in 2014 (action 6.2.1). Crews based in Central Point and Gold Beach conducted boat inspections, primarily on the I-5, Hwy 97, and Hwy 101 corridors, from late spring through early fall.

Management Strategy 6.3

Zone regulations were employed in 2014 because fall Chinook escapement was forecasted to exceed escapement goals related to conservation criteria (action 6.3.1), except that a gear restriction (bobber rule) was implemented by temporary rule on the Chetco River between September 1 and November 3, and the Winchuck River was closed to the harvest of fall Chinook between September 1 and December 31 (action 6.3.2). NP CHF escapement to the Winchuck population area was forecasted to fall to near conservation status. The Chetco NP CHF population was forecasted to exceed conservation criteria. Adoption of the bobber rule on the Chetco was aimed at reducing snagging activity during low flow conditions, while still providing early season harvest opportunity (action 6.3.8).

Regulations for the Chetco ocean terminal area fishery in 2014 were similar to recent years, except that the recreational season was shortened by 1 day (from 13 to 12) and the quota for the commercial season was reduced by 150 Chinook (from 750 to 600). Reductions were implemented because escapement to the Chetco was forecasted to fall near S_{MSY} and the Winchuck was forecasted to fall near conservation status (actions 6.3.5, 6.3.6). The recreational season was open October 1-12, harvest was estimated at 1,115 Chinook. The commercial season was open the earlier of October 12-31 or a quota of 600 Chinook, harvest was 473 Chinook.

ODFW established a work group to develop an allocation schedule for the sharing of allowable harvest between the freshwater fishery on the Chetco River and the special late-season near-shore fishery (Chetco ocean terminal area fishery) (action 6.3.8). The work group met on March 18, 2014. Freshwater bank anglers, freshwater boat anglers, guides, and ocean terminal recreational anglers were represented. Several commercial fishers that regularly participate in the Chetco ocean terminal fishery were invited but none attended. No consensus was reached on the allocation of allowable harvest between the ocean terminal and freshwater fisheries. Under a longstanding consensus agreement, reached in 1996, ODFW manages the fisheries for a 50/50 split of the allowable harvest between the freshwater and ocean terminal fisheries, with the ocean terminal portion of the allowable harvest being equally split between the recreational and commercial fisheries. Because no consensus was reached with the work group ODFW will continue to manage for a 50/50 split of the allowable harvest (long-term average is 46% freshwater and 54% ocean terminal harvest, the average split in the ocean terminal harvest is 54% recreational and 46% commercial). The work group reached consensus on the following Chetco ocean terminal fishery proposals:

- Regulations should maintain temporal separation between the recreational and commercial fisheries, except that some overlap is acceptable on years when Chetco escapement is forecasted to exceed desired status, and additional harvest opportunity may be available.
- Manage the ocean terminal fishery to maintain a 50/50 split of allowable harvest between recreational and commercial fisheries.
- Recreational season of October 1 through 2nd Sunday in October should be implemented on years when Chetco escapement is forecasted to fall between S_{MSY} (2,740) and desired status (3,800). Commercial quota should approximately equal expected recreational harvest.
- On years when Chetco escapement is forecasted to fall below S_{MSY} (2,740) ocean terminal fisheries would be curtailed.
- On years when Chetco escapement is forecasted to exceed desired status (3,800) additional opportunity would be considered.
- Mark-selective bag limit should be implemented in order to encourage harvest of hatchery-produced Chinook.

The work group also reached consensus on the following freshwater fishery proposals for the Chetco and Winchuck rivers:

- Mark-selective bag limit should be implemented in order to encourage harvest of hatchery-produced Chinook.
- Gear restrictions should be implemented in order to reduce snagging activity during the low flow period.
 - Gear restriction should be implemented between Sept. 1 and Nov. 3 (average Chetco flow exceeds 1,000 CFS on November 4).
 - Require use of bobber.
 - Limited to one single point hook.
 - Gear restriction implemented upstream of RM 2.2 on the Chetco. No gear restriction downstream of RM 2.2 to allow troll fishery in the estuary.
 - Gear restriction implemented upstream from the mouth on the Winchuck River.
- Freshwater fisheries would be curtailed (by temporary rule) on years when escapement is forecasted to fall below conservation status.

Proposed regulations, based on proposals developed with the work group, were reviewed at a May 20 2014 public meeting held in Brookings. Chetco ocean terminal area regulations for 2014 were adopted by the Oregon Fish and Wildlife Commission (OFWC) on June 6, 2014. Chetco and Winchuck river regulations for 2014 and 2015 were adopted by the OFWC on August 1, 2014.

Management Strategy 6.4

A release group of 26,000 smolts were acclimated at Ferry Creek reservoir (Chetco) in October 2014 and subsequently released into the Chetco River at Snug Harbor (action 6.4.3). The purpose of the project is to determine whether 1) returning adult Chinook acclimated at Ferry Creek contribute to the river fishery at a higher rate than non-acclimated Chinook; 2) acclimated Chinook are recovered from natural spawning areas at a lower rate than non-acclimated Chinook.

157,000 Chetco fall Chinook smolts were released October 13-16, 2014 at Social Security Bar (action 6.4.4).

Management Strategy 6.5

ODFW did not complete any work specific to Management Strategy 6.5 in 2014.

OTHER

Pacific Fishery Management Council (PFMC), at their Nov 14-19 2014 meeting, adopted the Rogue Aggregate population as the indicator stock for southern Oregon coastal Chinook (SOCC). PFMC adopted a conservation objective for SOCC of at least 41,000 naturally produced adult Chinook passing Huntley Park on the Rogue River, an S_{MSY} of 34,992, a maximum fishing mortality threshold (MFMT) of 54%, and a minimum stock size threshold (MSST) of 18,440 (or 20,500 at Huntley Park). The management objectives are based on analysis embedded in the Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit. The previous conservation objective for SOCC was 60-90 spawners/mile, with an S_{MSY} of 60 spawners/mile in index streams, MFMT of 78%, and MSST of 30 spawners/mile in index streams. The index streams for SOC Chinook were Deep Creek (Pistol River), Emily Creek (Chetco River), and Bear Creek (Winchuck River). The Rogue Aggregate was adopted as the indicator stock for SOC Chinook at the request of ODFW. The Rogue Aggregate Conservation Objective is expected to provide a more accurate representation of SOCC status as compared to the previous, generalized Conservation Objective.

A diet study, initiated in the lower Rogue River in 2013, to determine the level of predation by double-crested cormorants on juvenile salmonids, was continued in 2014. A Scientific Collecting Permit was obtained from the U.S. Fish and Wildlife Service Migratory Bird Permit Office, allowing lethal collection of up to 50 double-crested cormorants in the lower Rogue River. During the period of mid-August – mid-October 2014, a total 44 cormorants were lethally collected. All of the cormorants collected were subadults. A preliminary (visual) analysis of stomach contents determined that 12 stomach samples included at least one salmonid and a total of 24 confirmed salmonids were found in stomach samples (Table 3, located at the end of this document). Most consumed salmonids appeared to be Chinook (genetic analysis of stomach contents will provide final identification). Survey data indicated that approximately 100 double-

crested cormorants, on average, were using the lower Rogue River during August – September 2014 (n = 13 surveys, high count = 128, mean = 92.6). Additional double-crested cormorant stomach samples are scheduled to be collected from the lower Rogue River August – September 2015 pending approval of funding.

Table 4. Summary of progress related to management actions described in the fall Chinook salmon Conservation Plan, as related to the Rogue Stratum of the SMU. The “X” symbol means that ODFW completed work on an action that requires annual attention. The “Y” symbol means that ODFW completed the action and that no further work is needed. The “Z” symbol means that ODFW completed work on an allied topic that complemented the action item included in the conservation plan. The “--” symbol means that no ODFW work was completed on the action item during the year.

Action Item	Year of completion for action item									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	
MANAGEMENT STRATEGY 4.1										
4.1.1	X	X								
4.1.2	X	X								
4.1.3	Y									
4.1.4	X	X								
4.1.5	X	X								
4.1.6	X	X								
4.1.7	X	X								
4.1.8	n/a	n/a								
4.1.9	X	X								
4.1.10	--	--								
4.1.11	--	--								
4.1.12	--	--								
4.1.13	--	--								
4.1.14	X	X								
4.1.15	X	n/a								
4.1.16	X	X								
4.1.17	X	X								
MANAGEMENT STRATEGY 4.2										
4.2.1	X	X								
MANAGEMENT STRATEGY 4.3										
4.3.1	--	--								
4.3.2	X	X								
MANAGEMENT STRATEGY 4.4										
4.4.1	X	X								
4.4.2	n/a	n/a								
4.4.3	n/a	n/a								
4.4.4	n/a	n/a								
MANAGEMENT STRATEGY 4.5										
4.5.1	X	X								
4.5.2	n/a	n/a								
4.5.3	Y									
4.5.4	X	X								

Table 5. Summary of progress related to management actions described in the fall Chinook salmon Conservation Plan, as related to the Coastal Stratum of the SMU. The “X” symbol means that ODFW completed work on an action that requires annual attention. The “Y” symbol means that ODFW completed the action and that no further work is needed. The “Z” symbol means that ODFW completed work on an allied topic that complemented the action item included in the conservation plan. The “--” symbol means that no ODFW work was completed on the action item during the year.

Action Item	Year of completion for action item									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	
MANAGEMENT STRATEGY 6.1										
6.1.1	--	--								
6.1.2	X	X								
6.1.3	--	--								
6.1.4	--	--								
6.1.5	--	--								
6.1.6	--	--								
6.1.7	--	--								
6.1.8	X	X								
6.1.9	--	--								
6.1.10	X	X								
6.1.11	--	--								
6.1.12	--	--								
6.1.13	--	--								
6.1.14	--	--								
6.1.15	--	--								
6.1.16	n/a	n/a								
6.1.17	--	--								
MANAGEMENT STRATEGY 6.2										
6.2.1	X	X								
MANAGEMENT STRATEGY 6.3										
6.3.1	X	X								
6.3.2	n/a	X								
6.3.3	n/a	n/a								
6.3.4	n/a	n/a								
6.3.5	X	X								
6.3.6	n/a	X								
6.3.7	n/a	X								
6.3.8	--	Y								
MANAGEMENT STRATEGY 6.4										
6.4.1	X	X								
6.4.2	n/a	n/a								
6.4.3	X	X								
6.4.4	X	X								
6.4.5	Y									
6.4.6	X	X								
MANAGEMENT STRATEGY 6.5										
6.5.1	--	--								

PRE-SEASON FORECASTS

ODFW fishery managers will utilize pre-season forecasts to determine if (1) NP CHF populations might reach conservation criteria and (2) to determine the number of NP CHF that can be harvested in the late-season terminal fishery that operates off the mouths of the Chetco and Winchuck rivers. The efficacy of any annual forecast will, by default, be questionable because of substantial uncertainty in (1) the stock size estimates before the onset of any fishing in spring, (2) the forecasted harvest rates of CHF in the ocean fisheries that operate in federally managed waters, and (3) the forecasted harvest rates in the recreational freshwater fisheries. However, management criteria for each population are based on spawner escapements over multiple (2 or 3) years, which helps buffer the uncertainty associated with the pre-season forecasts.

Preseason Forecasts in Relation to Conservation Criteria

Harvest opportunities in the recreational freshwater fisheries will be constrained to some degree if the pre-season forecasts indicate that NP CHF populations will drop into conservation status. As described in the conservation plan, this situation can be expected in 6-23% of the years, depending on the population in question. Based on the pre-season forecasts for 2015, no additional constraints appear warranted for any of the freshwater recreational fisheries (Table 6).

Table 6. Forecasted 2015 spawning escapement of age 3-6 NP CHF in relation to conservation status criteria that cover multiple years. For each population, the forecasted number of spawners includes the 2015 forecast and estimated spawner numbers in the previous year or previous two years.

Population (s)	Conservation criterion	Forecasted number of spawners	Conservation shortfall
Rogue Aggregate	20,400 ^{ab}	54,746 ^{ab}	0
Lower Rogue	1,500 ^c	5,410 ^c	0
Chetco	1,440 ^b	4,222 ^b	0
Winchuck	300 ^b	773 ^b	0
Pistol	540 ^c	1,927 ^c	0
Hunter	300 ^c	1,084 ^c	0

^a Criterion covers passage at Huntley Park instead of spawning escapement.

^b Covers 2014 (estimated spawners) and 2015 (forecasted spawners).

^c Covers 2013 and 2014 (estimated spawners) and 2015 (forecasted spawners).

Preseason Forecasts in Relation to Management of the Chetco Terminal Fishery

The conservation plan outlines that harvest opportunities in the late-season, near-shore, Chetco terminal fishery will be based on the number of estimated spawners needed for maximum sustained yield (Smsy) in population areas proximal to the Chetco River (Action 6.3.5 in Management Strategy 6.3 for the Coastal Stratum). ODFW completed an assessment of the efficacy of pre-season forecasting needs associated with this fishery and because the Smsy estimates pertain to *average* conditions, ODFW concluded that harvest opportunities in the Chetco terminal fishery should be based on a three year arithmetic mean. ODFW also concluded that management of the Chetco terminal fishery should only be based on the Chetco and Winchuck populations, because the other populations in the SMU contribute to the fishery at very low rates; as described in the conservation plan.

Harvest opportunities in the late-season, near-shore Chetco terminal fishery will be constrained to some degree if the pre-season forecasts indicate that NP CHF populations will drop below individual Smsy needs estimated for the Chetco and Winchuck populations of NP CHF. ODFW estimates that this situation can be expected in 40% of the years. Based on spawner numbers in 2013 and 2014, and the pre-season forecast for spawner numbers in 2015, there is an opportunity to harvest NP CHF in the terminal fishery during 2015 (Table 7).

Table 7. Forecasted 2015 spawning escapement of age 3-6 NP CHF in relation to Smsy estimates for the Chetco and Winchuck populations. For each population, the forecasted number of spawners includes the 2015 forecast and estimated spawner numbers in 2013 and 2014.

Population	Smsy	Forecasted number of spawners	Difference
Chetco	2,740	3,812 ^a	1,072
Winchuck	560	631 ^a	71

^a Covers 2013 and 2014 (estimated spawners) and 2015 (forecasted spawners).

Table 3. Preliminary 2014 Rogue double-crested cormorant diet analysis, identifiable prey biomass only*

Sample Period	N	Salmonid	Chinook	Unid Sal ¹	Cyprinid ²	Osmerid ³	Surfperch	Stickleback	Sculpin	Gunnel	Unid Nonsal ⁴	Crustacean ⁵
Late August	8	45.6%	17.6%	28.0%	1.4%	0.0%	0.0%	4.4%	0.0%	0.0%	11.1%	37.5%
Late September	15	17.8%	6.3%	11.5%	21.8%	2.2%	0.0%	13.3%	17.5%	1.7%	22.9%	2.8%
Late September	8	63.9%	13.6%	50.3%	0.0%	0.0%	10.2%	12.5%	0.9%	0.0%	12.5%	0.0%
Early October	7	57.2%	18.6%	38.6%	0.0%	13.4%	0.0%	20.6%	0.0%	0.0%	0.0%	8.8%
Total	38	42.5%	12.5%	29.9%	7.7%	0.7%	3.4%	10.1%	6.1%	0.6%	15.5%	13.4%

*based on an average of 90.47% of all prey biomass in foregut having been identifiable

*2,523.2 grams identifiable biomass

¹ unidentifiable salmonid prey items

² redbside shiner, pikeminnow

³ smelt

⁴ unidentified non-salmonid prey items

⁵ crayfish