February 3, 2014

MEMORANDUM

TO: **Fish and Wildlife Committee members**

FROM: **Tony Grover**

SUBJECT: **Evaluating the Efficacy of Management Actions to Reduce Caspian Tern Predation on ESA-listed Salmonids in the mid-Columbia Region**

BACKGROUND:

Presenter: **Chuck Berrie, Grant PUD, Assistant General Manager; Curt Dotson, Grant PUD, Special Projects; Denny Rohr, D. Rohr & Associates.**

Summary:
Anecdotal evidence in the 1990's to 2000's suggested Caspian Terns were consuming a significant number of steelhead smolts in the Priest Rapids Dam Project area. Accordingly, Grant PUD was/is not meeting its project-level juvenile steelhead survival standard despite having excellent concrete survival at the dams. The result is Grant PUD paying nearly $2 million annually into a no-net-impact mitigation fund.

While Tern predation was thought to be the problem, Grant PUD has no authority to manage/mitigate the impacts. Therefore, the strategy of Grant PUD is to provide funding to include monitoring/evaluation work, and to support federal Action Agencies in their efforts to address the issue as part of the FCRPS BiOp.

Grant PUD will discuss the studies, resultant data, reports, and related activities taking place in the mid-Columbia region regarding this issue.

Relevance:
Part Three.IV.A.4 of the 2014 Fish and Wildlife Program states: "The Council will encourage more aggressive efforts by the Corps and others to make the fullest possible

use of their existing authority to remove or manage avian predation that is impacting wild fish populations.”

Workplan:
Predator control activities are included as an issue to be tracked and reported on periodically.

Background:
none

More Info:
See attached PowerPoint presentation.

Evaluating the efficacy of management actions to reduce Caspian Tern predation on ESA-listed salmonids in the mid-Columbia region

Northwest Power and Conservation Council

Fish Committee Meeting

February 10th, 2015

Grant PUD

USGS science for a changing world

RTR REAL TIME RESEARCH

OSU Oregon State UNIVERSITY

Why Does Grant PUD Care About Caspian Terns?

- Anecdotal evidence in 1990's – 2000's suggested terns were consuming a significant number of steelhead smolts in our project area
- Grant PUD was/is not meeting its project-level juvenile steelhead survival standard despite having excellent concrete survival
- Grant PUD was/is paying nearly $2.0M into a no-net-impact mitigation fund on an annual basis
- Tern predation thought to be the problem, yet Grant PUD has no authority to manage/mitigate the impacts
- Strategy – provide funding for monitoring/evaluation work, support federal Action Agencies in their efforts to address the issue as part of the FCRPS BiOp

Background

- Caspian terns nesting on Goose Island in Potholes Reservoir annually consume an average of 15.7% of ESA-listed steelhead smolts and 2.5% of ESA-listed spring Chinook smolts out-migrating from the upper Columbia River
- Action Agencies attempted to dissuade all Caspian terns from nesting on Goose Island-Potholes Reservoir in 2014
- Dissuasion included passive (stakes, ropes, & flagging) and active (human hazing) measures
- Researchers evaluated the efficacy of Caspian tern management actions on Goose Island for reducing predation on ESA-listed salmonids

2014 Tasks

Task 1: Monitor effects of management (nest dissuasion activities) on Caspian terns at Goose Island-Potholes Reservoir

Approach: Intensive colony monitoring

Task 2: Determine changes in predation rates on smolts by Caspian terns following nest dissuasion on Goose Island-Potholes

Approach: PIT-tag steelhead and yearling Chinook at Rock Island Dam; scan for PIT tags on Goose Island after tern nesting

2014 Tasks (cont.)

Task 3: Determine total smolt mortality in the Wanapum-Priest Rapids Project (original task) and in the McNary-John Day Project (supplemental task) in relation to avian predation: spatial and temporal losses of acoustic-tagged smolts (JSATS)

Approach: Release acoustic-tagged smolts into Wanapum-Priest Rapids reservoirs (GPUD) and McNary-John Day reservoirs (USACE); scan for acoustic tags on multiple bird colonies

Results

Task 1: Active and Passive Dissuasion




- Dissuasion materials delivered to Goose Island via helicopter (25 February)
- Passive dissuasion constructed with pier blocks, rebar, PVC tubing, polypropylene rope, and caution tape
- 2.5 acres of tern nesting habitat covered with passive dissuasion
- Active hazing of gulls and terns initiated in late March

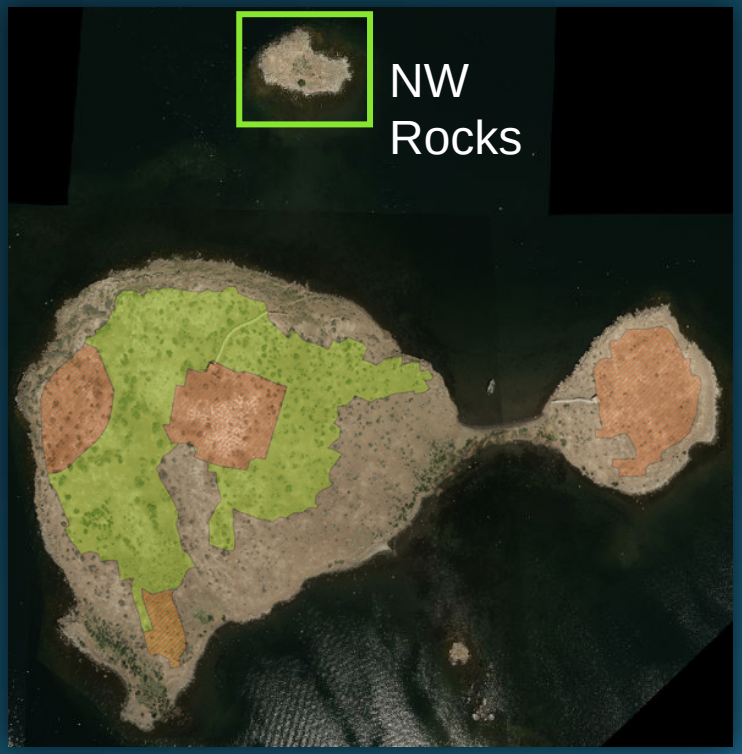
Results

Task 1: Active and Passive Dissuasion

- Successful in preventing Caspian terns from nesting on Goose Island proper
- 3 pairs of Caspian terns attempted to nest
- 3 Caspian tern eggs were removed from nests soon after laying by researchers

Results

Task 1: Dissuasion



- Caspian tern nesting initiated on Northwest Rocks on 23 April
- No prior history of Caspian terns nesting on Northwest Rocks
- Action agencies decided not to haze NW Rocks due to lack of NEPA coverage
- 159 Caspian tern pairs nested on NW Rocks
- 46 fledglings Caspian terns raised

Results

Task 2: Goose Island Tern Predation Rates

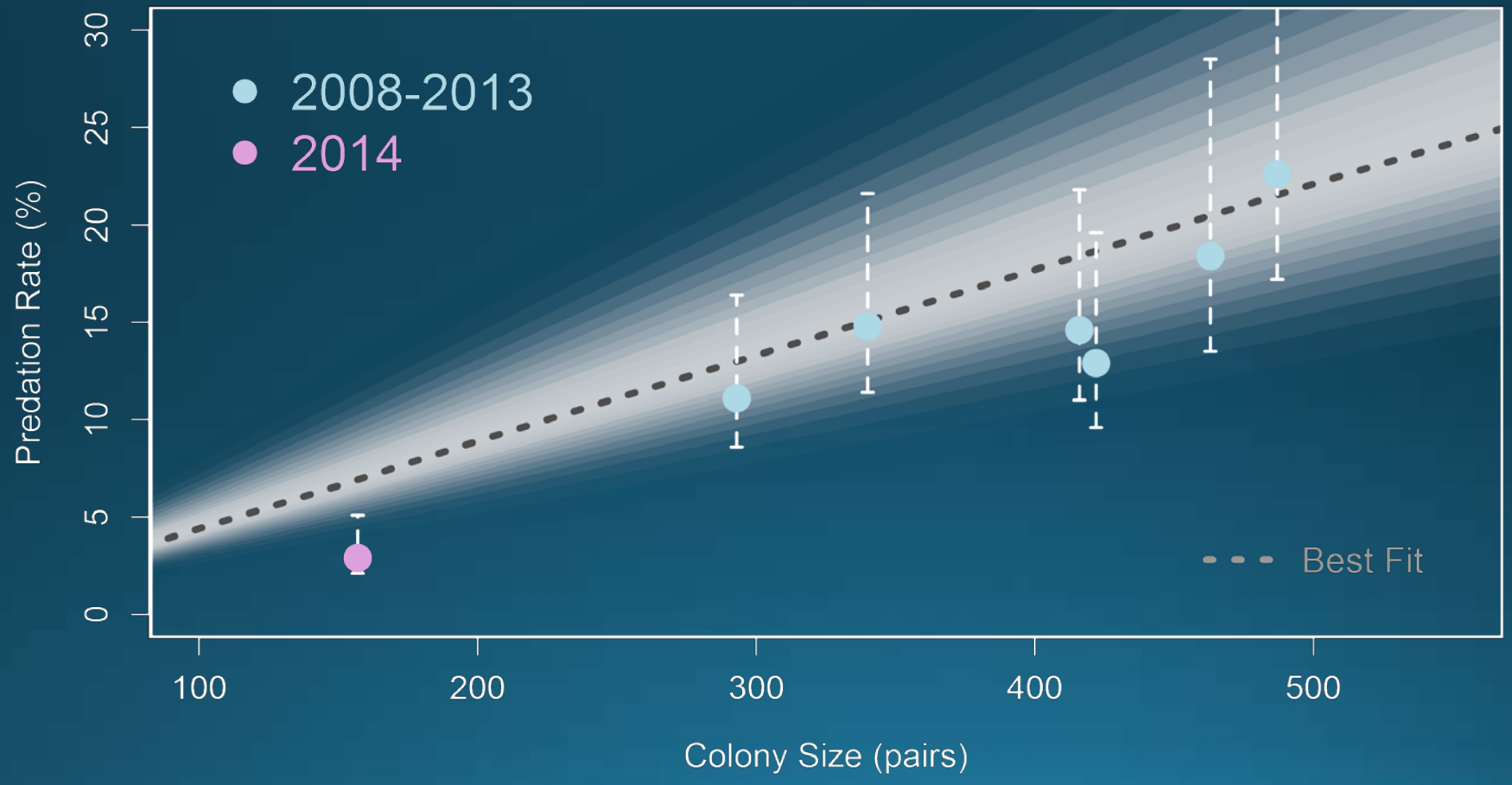
- Smolts PIT-tagged at Rock Island Dam from 12 April to 13 June 2014
- 7,757 steelhead and 5,446 yearling Chinook smolts PIT-tagged
- Representative samples by size, rear-type, run-timing, and condition

Species	Pre-management 2008-2013*	Post-management 2014 (Phase I)	Change
Yearling Chinook	2.5% (1.7-3.6)	0.3 (0.1-0.7)	- 2.2 (1.6-2.9)
Steelhead	15.7% (14.1-18.9)	2.9% (1.9-5.1)	- 12.7% (12.2-13.8)

**Limited numbers (< 2,000) of yearling Chinook were available for predation analyses prior to 2013*

Results

Task 2: Goose Island Tern Predation Rates on Steelhead Smolts Pre- and Post-Management



Results

Steelhead Smolt Survival Pre- and Post-Management in the Priest Rapids Project

Year	WAN Dam Survival (%)	WAN Develop Survival (%)	PR Dam Survival (%)	PR Develop Survival (%)	TOTAL PROJECT Survival (%)
2008	96.5	95.8	91.8	86.4	82.8
2009	97.3	94.4	95.4	88.1	83.1
2010	97.1	88.0	96.1	89.4	78.7
TARGET	**95.0**	**93.0**	**95.0**	**93.0**	**86.5**
2014	97.8	92.9	98.5	96.1	89.3

Results

Route-Specific 2014 Steelhead Smolt Survival in the Priest Rapids Project

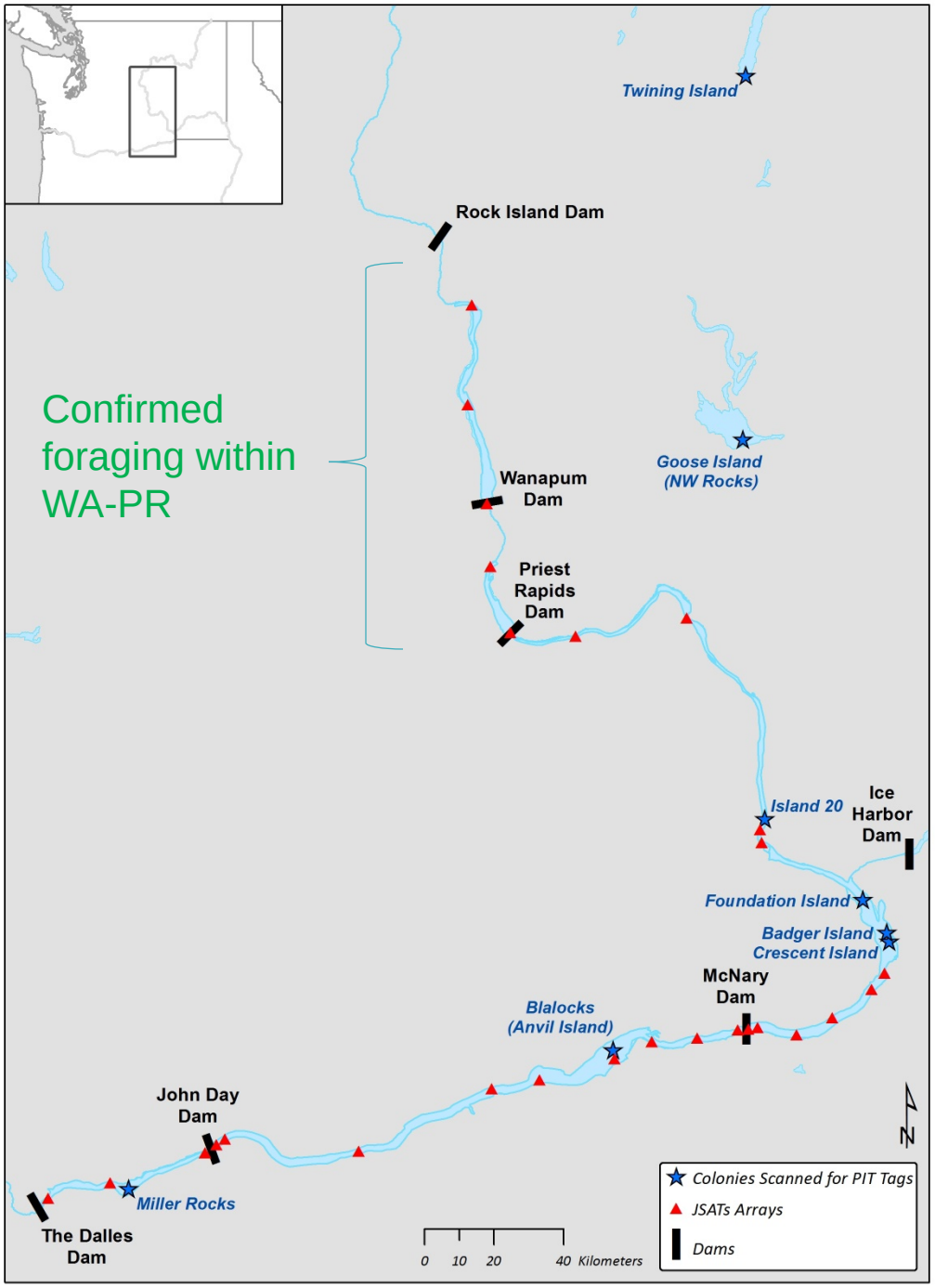
Passage Route	WANAPUM		PRIEST RAPIDS	
	Number Passed	Detected Downstream	Number Passed	Detected Downstream
Fish Bypass	36	100.0%	507	99.6%
Spillway	164	99.4%	236	97.0%
Powerhouse	152	94.1%	276	93.8%

Predation Rates by Twinning Island (Banks Lake) and Crescent Island (McNary Reservoir) Caspian Terns on Upper Columbia River Steelhead

Colony	Species	2008-2013	2014	Change
Crescent Island	Steelhead	2.3% (2.0-2.7)	3.4% (2.5-4.9)	+ 1.1 (0.5-2.2)
Twinning Island	Steelhead	0.1% (<.1 – 0.3)	1.1 (0.4-2.7)	+ 1.0 (0.4-2.4)

Preliminary Results
Task 3: JSATS-tagged fish

Island	Predator	Chinook	Steelhead
Twinning Island	Caspian Tern	1	5
Goose Island	Caspian Tern	1	12
Island 20	Gull	-	4
Foundation Island	Do.-cr. Cormorant	-	-
Badger Island	Amer. Wh. Pelican	-	-
Crescent Island	Caspian Tern	2	45
Crescent Island	Gull	3	10
Anvil Island	Caspian Tern	-	4
Anvil Island	Gull	-	4
Anvil Island	Mix	-	7
Miller Rocks	Gull	1	10
ALL	**Mix**	**8**	**102**



Summary

- Efforts to prevent Caspian terns from nesting on Goose Island were only partly successful due to colony that formed unexpectedly on Northwest Rocks

- Management efforts on Goose Island demonstrated that dissuasion (passive & active) can prevent nesting by Caspian terns

- Predation on ESA-listed steelhead and spring Chinook by Goose Island Caspian terns was significantly reduced in 2014 compared with pre-management estimates

- Increased predation from Caspian terns nesting at nearby colonies (Banks Lake, Crescent Island) slightly offset benefits from a smaller Goose Island tern colony in 2014

- JSATS-tagged salmonids indicate that both managed and un-managed colonies consumed ESA-listed salmonids in and around the Wanapum-Priest Rapids Project in 2014 (detailed analysis pending)


Questions?