

# A Video Monitoring System to Evaluate Ocean Recreational Fishing Effort in Astoria, Oregon

FY 2014 Proposal

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# 1. Overview

## 1.1. Sponsor

Steve Williams

## 1.2. Focus Group

Survey Design and Evaluation

## 1.3. Background

Over the past several years, ODFW has implemented a video boat count methodology in selected ports to estimate recreational fishing effort. This approach has resulted in increased accuracy of daily effort counts and improved flexibility and efficacy of sampling procedures (Ames and Schindler, 2009). Video monitoring systems can provide a number of advantages over standard physical bar crossing counts. Digital-recordings of bar crossing counts provide a high resolution image of departing/returning vessels, allowing for reliable identification of boat type (e.g., private sport vessel, charter fishing vessel, commercial fishing vessel, etc.) and increased accuracy of boat counts. Recording vessel activity also eliminates the need for a sampler to conduct an on-site visual count and the review of recordings and effort counts can be accomplished more quickly than the traditional on-site method. The reduced time constraints improve survey design and sampling coverage by shifting sampler effort from boat counting duties to collecting data through angler intercept interviews. The lower Columbia River Estuary poses a significant challenge to estimating ocean recreational fishing effort. Because both Oregon and Washington vessels enter the ocean at the mouth of the Columbia River, a standard bar crossing count approach cannot effectively be used to estimate ocean recreational fishing effort originating from Oregon ports. ODFW currently employs an on-site boat counting approach in which vessels are tallied as they cross a North/South line extending from the Hammond Boat Basin to the Washington shore. However, this method has the potential to bias the Oregon-based recreational effort estimate due to the inclusion of Washington boats in the count and from errors in counting due to poor visibility across the Columbia River. Additionally, Oregon-based ocean recreational effort originates almost entirely from three main access points in the lower Columbia River Estuary: the Hammond boat ramp, the Warrenton boat ramp and the Astoria west mooring basin. These sites are geographically separated to such an extent that daily on-site boat counts would be required to quantify the effort associated with each port across all relevant strata. Assigning samplers to conduct these counts would be extremely inefficient from a survey design standpoint and would likely lead to decreased sampling coverage and unreliable catch estimates. The Astoria area would be an ideal candidate for a video monitoring system. In evaluating this system, it will be possible to also consider how this approach might be applied to multiple small port bar crossing counts being consolidated to a single counting location. This technology would allow ODFW to quantify the ocean recreational fishing effort from the three major access sites in the lower Columbia estuary without reallocating sampler resources away from catch data collection. The project will evaluate the existing effort estimation methodology being used and potentially improve sampling strategies to produce more accurate estimates of recreational fisheries catch and effort in the future.

## 1.4. Project Description

The Oregon Department of Fish and Wildlife's Ocean Sampling Project is proposing to install and employ a video monitoring system in order to both evaluate current effort tracking methodology and a potential new approach to video boat count systems. If effective, this would improve estimates of ocean recreational fishing effort in the Astoria area, and provide a review of a different video-based approach that could then be considered in other locations. The video boat count system will consist of three cameras located at the major ocean recreational access points along the Oregon shore in the lower Columbia River Estuary and a fourth camera aimed across the Columbia River main channel. The cameras will continuously record boats departing and returning from these access points and the video feed will be consolidated via high-speed internet to a central location for simultaneous counts of out-going vessels from all four vantage points. The benefits of the proposed project are multifold and address MRIP priorities for improving the data collection and quantification of marine recreational catch and effort. Implementation of a video boat count system in the Astoria area will provide the resources to evaluate the performance of our existing boat count methodology, reduce errors associated with physical bar crossing counts, improve survey design and sampling coverage, and increase the overall accuracy and precision of ocean recreational effort and catch estimates. The performance of the existing effort estimation procedure for the Astoria area will be assessed by conducting the current daily standard physical boat counts and video-based boat counts concurrently. The study will compare effort estimates generated from three boat counting strategies; one on-site physical count and two video-based counts. The on-site physical count will serve as the baseline for comparison and will follow our existing procedure. A second effort estimate will be generated based on counts of boats obtained from a single camera whose viewing angle approximates that of our on-site count across the Columbia River. The third estimate will be derived from a system of three cameras located at major Astoria-area access points. Individual effort estimates from each of these access points will be summed to provide a total effort estimate to be used in the comparison. Daily estimates of recreational boating effort derived from on-site and video-based estimates will be compared and tested for significant differences to evaluate our current methodology and also to identify the most appropriate counting strategy. Additionally, associated catch estimates will also be compared to assess the degree to which differences in effort estimation resulting from each boat counting procedure affects catch accounting. The standard bar crossing count methodology currently being used in the Astoria area consists of counting the number of boats heading downstream from a North/South line from the Hammond Boat Basin. Because both Oregon and Washington vessels may traverse this line on their way upstream or

downstream, Oregon-based ocean recreational effort estimates may be biased. Monitoring recreational vessel departures from the major Astoria access points eliminates the possibility of including Washington-based effort in our estimates. Additionally, the relatively long range across the Columbia River and the prevalence of fog can reduce visibility and lead to uncounted boats or misidentified boat types during standard boat counts. Proposed camera positioning at each access point has been designed to minimize the distance from the camera to the departure/return point, thus minimizing errors due to reduced visibility. Currently, the relative proportion of ocean recreational effort originating from each access point in the Astoria area is only assumed. A formal evaluation has not been conducted to quantify the amount of effort associated with each access point and whether these proportions vary temporally. An understanding of the relative contribution from each access point to the overall ocean recreational fishing effort will guide survey design in order to achieve proportional allocation of sampling coverage. This is particularly important if fishing behavior differs between participants departing from each access point. Quantifying the proportion of effort at each site will reduce potential sampling bias and increase the precision of effort and catch estimation. Employing a video boat counting system in the Astoria area will also help to optimize sampling coverage by shifting sampler hours from standard boat counting duties to angler interception activities. Due to the geography of the area, sampler assignments are split not only between boat counts, private recreational sampling, charter recreational sampling and commercial salmon troll sampling, but also between access points. If this study proves effective, in the future, a video monitoring system will eliminate the need for a sampler to be physically present during daily boat counts from before sunrise until 10:15am, as is currently performed under the standard boat count protocol. Samplers will now be able to strategically select boat count viewing times to optimize sampling efficiency during periods of increased boat returns. Under the new methodology, the sampler's responsibilities could be reassigned to provide greater coverage and increased sampling rates during previously under-sampled spatial and temporal strata. Therefore, the implementation of a video boat count system in Astoria may result in both improved recreational ocean effort estimates and catch accounting.

## 1.5. Public Description

### 1.6. Objectives

- Install a video monitoring system at major access points in the Astoria area and implement a video boat counting methodology using this technology to estimate ocean recreational fishing effort.
- Evaluate the current boat count methodology for the Astoria area by comparing effort and catch estimates generated by concurrent on-site standard boat counts and video-based boat counts.
- Quantify the relative proportion of ocean recreational fishing effort originating from each of the major access points in the lower Columbia estuary.
- Improve overall catch and effort estimation in the Astoria area.
- Evaluate this new effort accounting system for application in other locations

### 1.7. References

Ames, R.T. and E. Schindler. 2009. Video Monitoring of Ocean Recreational Fishing Effort. Oregon Department of Fish and Wildlife. Breidt, F.F. and J.D. Opsomer. 2010. Consultants' Report: Preliminary Review of Ocean Recreational Boat Survey.

## 2. Methodology

### 2.1. Methodology

An experienced subcontractor will be employed to procure and install the necessary equipment and software for the video monitoring system. From previous discussions and on-site visits with a surveillance specialist, camera locations at the Hammond boat ramp, the Warrenton boat ramp and the Astoria west mooring basin have already been selected for basin-specific boat counts. Additionally, a fourth camera will be installed at the Hammond boat basin with a viewing angle directed along a North/South line towards the opposite shore of the Columbia River to mimic and provide a comparison to the existing physical boat count. A station for viewing recorded videos will be set up in the ODFW Astoria field office. Existing utilities will be used to power the cameras at each site and high-speed wireless connections will be established to provide a feed to the Astoria field office. The feasibility of establishing wireless connections at each location has been previously discussed with a communications company and confirmed achievable. Throughout the study period, five seasonal port samplers will be assigned to sample the Astoria area. Each day, one sampler will be assigned to conduct a standard on-site boat count following the existing protocol and one sampler will conduct video boat counts under the new methodology. The sampler conducting the video boat counts will document departing and returning vessels from each of the four camera recordings. Using these counts, three daily effort estimates for the Astoria area will be generated. First, the on-site boat count effort estimation procedure will follow our current methodology, which includes both a tally of boats crossing downstream and a ratio expansion from interviews for the proportion of boats that left outside of the counting period. Second, the effort estimate generated from the single camera located at Hammond will utilize the same expansion method as our on-site estimation procedure, but will instead be based on counts of recorded vessels (both a count comparing the same time frame as the on-site count and an extended 4:15-20:15 count will be tallied). And third, the number of ocean recreational fishing trips using the multiple access point video monitoring system utilizing a 4:15-20:15 counting period. The departing vessel count from each of the three access points will be expanded for interviews that occur outside the count period and adjusted using the ratio of ocean to estuary trips based on sampler interview data. The expanded estimates for all three access sites will then be summed to obtain a total effort estimate for the Astoria area. Analyses will be conducted to compare daily estimates of effort from each methodology. Because catch estimates are generated on a weekly basis, calculated landings associated with effort estimates from each method will be compared at the statistical week level.

## **2.2. Region**

Pacific

## **2.3. Geographic Coverage**

Astoria, Oregon ports: Hammond Boat Basin, Warrenton Boat Basin, Astoria West-end Mooring Basin

## **2.4. Temporal Coverage**

Vessel counts will be compared during the 2014 and 2015 seasons following installation of video.

## **2.5. Frequency**

Counting is planned to occur for all days during the work period once equipment is operational.

## **2.6. Unit of Analysis**

Daily ocean recreational fishing boat trip

## **2.7. Collection Mode**

Digital-video recording, on-site visual boat counts, access point angler interviews

## **3. Communication**

### **3.1. Internal Communication**

Internal communication will occur as needed by phone and direct field contacts. Weekly reports, boat counts, and other data will be transferred to the Newport office on a weekly basis. Seasonal field staff will be contacted typically at least once each week by the sampling coordinator for review of activities and to discuss any issues.

### **3.2. External Communication**

(1) Monthly progress reports on project status.(2) Final project report that will compare results with prior methodology.

## **4. Assumptions/Constraints**

### **4.1. New Data Collection**

N

### **4.2. Is funding needed for this project?**

Y

### **4.3. Funding Vehicle**

Tentatively: RecFIN grant (PSMFC); may change to new NMFS grant for earlier \$ (see schedule)

### **4.4. Data Resources**

Effort estimates for Astoria-area ports exist, based on historic and current on-site visual boat counts by seasonal samplers. A major project objective is to evaluate this methodology by comparing estimates of ocean recreational boat trips generated from video boat count review with estimates based on the on-site visual counts.

### **4.5. Other Resources**

### **4.6. Regulations**

### **4.7. Other**

ODFW would be required by Oregon state regulation to solicit bids for a subcontract for the video camera installation work on this project. Assumptions include the successful completion of a bid and contract award process, and continued cooperation by the appropriate property owners/managers at sites where we propose to mount cameras (preliminary approval has been granted). Ongoing assumptions required for the success of all of ODFW's video boat counts include the proper functioning of all relevant hardware and software, and consistent supply of electricity to the cameras/recording system. The contractor cost estimate in this proposal is based on an estimate provided by a reliable, experienced contractor after a site visit and discussion. Actual contractor costs may vary as we would be required to go out for bid for the video installation and set-up services, and may end up with a different contractor.

## 5. Final Deliverables

### 5.1. Additional Reports

None (final report only)

### 5.2. New Data Set(s)

Video-based ocean recreational effort counts for the Astoria, Hammond, and Warrenton boat basins.

### 5.3. New System(s)

Video boat count system for Astoria area ports

## 6. Project Leadership

### 6.1. Project Leader and Members

First Name	Last Name	Title	Role	Organization	Email	Phone 1	Phone 2
Jason	Edwards	Ocean Sampling Asst. Proj. Leader	Team Member	Oregon Department of Fish & Wildlife	jason.l.edwards@state.or.us	541-867-4741	
Eric	Schindler	Ocean Sampling Project Leader	Team Member	Oregon Department of Fish & Wildlife	eric.d.schindler@state.or.us	541-867-4741	
Maggie	Sommer	Marine Technical & Data Services Section Manager	Team Leader	Oregon Department of Fish & Wildlife	maggie.sommer@state.or.us	541-867-4741	

## 7. Project Estimates

### 7.1. Project Schedule

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
4	Hire seasonal employees		04/01/2014	04/20/2014	
1	Develop specifications for contract requirements and post for bid (as needed) on state website		04/01/2014	04/20/2014	Y
2	Award contract for video system installation	1	04/21/2014	04/30/2014	Y
3	Installation and set-up of 3 Astoria-area video boat count systems	2	05/01/2014	05/20/2014	Y

Task #	Schedule Description	Prerequisite	Schedule Start Date	Schedule Finish Date	Milestone
6	Ongoing review of Astoria video recordings, development of ocean effort estimates (boat-trips)	3	05/15/2014	09/30/2014	
5	Train seasonal employees in boat counting and sampling tasks	4	04/28/2014	05/15/2014	
7	Summarize Astoria video effort count system in final report (DELIVERABLE)	6	11/01/2014	01/31/2015	

## 7.2. Cost Estimates

Cost Name	Cost Description	Cost Amount	Date Needed
Video equipment and associated hardware & software	Video equipment and associated hardware & software	\$17951.00	04/01/2014
ODFW Indirect (overhead)	26%; not charged on subcontract cost	\$23656.00	04/01/2014
PSMFC administrative fee	1.51%	\$1731.00	04/01/2014
Utility installation and 12 months of usage	Utility installation and 12 months of usage at 3 Astoria-area sites	\$3750.00	04/01/2014
Subcontract for video equipment installation and set-up	Subcontract for video equipment installation and set-up	\$5000.00	04/01/2014
Personnel Services	Salary & benefits for 1 mo ORBS proj. lead., 2 months ORBS asst. proj. lead., 10 mo. sampler	\$64283.00	04/01/2014
TOTAL COST		\$116371.00	

## 8. Risk

### 8.1. Project Risk

Risk Description	Risk Impact	Risk Probability	Risk Mitigation Approach
Equipment or service failure	Various levels of failure could occur, and with multiple interfacing systems the rate of failure may be a problem. This project has potential failure points at: the camera, power, digital video recorder, internet	High	Based on prior video monitoring experience within the project, there is a high chance of some service interruption or equipment problem during the operational period. Most failures are likely to be very short duration.

Risk Description	Risk Impact	Risk Probability	Risk Mitigation Approach
	connection, download of video, and video reviewing equipment. These points include equipment at four separate sites. Barring theft or vandalism or a catastrophic failure such as an electrical fire, it is anticipated that most equipment or service failures would be able to be rectified within 24-48 hours of being identified.		These short term equipment failures can likely be addressed through data interpolation for the site that is out of commission.
Unable to secure contract bid for equipment and installation within budget	Would delay or prohibit proceeding with project as planned.	Low	Drop some equipment from planned installation. Reduce personnel costs of seasonal time to compensate for increased costs.
Unable to secure camera location site agreements as previously scoped out.	Could compromise the quality of project results if less desirable sites have to be selected. May delay full start up of project.	Low	Other locations for camera installation would need to be selected and secured. Alternate camera systems with different lens configuration might need to be selected.
Delay in funding	Delayed funding would result in a major temporal shift in the project, and all task dates would have to be adjusted.	Medium	Request a budget extension to cover a full fishing season in 2015. This is expected to cause various complications in costs, and hiring of seasonal employees. If funding is able to be accessed by June 1, 2014, then the project should be able to make internal adjustments in a way that a meaningful test of the new approach could still be completed within the 2014 fishing season. If funding is delayed beyond that date, an extension of the contract through December 31, 2015 is expected to be required in order to get a full evaluation. The delay would also increase risks associated with equipment damage.

## **9. Supporting Documents**