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Economic Impacts of Killer Whale Regulations: Summary, Retrospective Review, and Data Needs

March 28, 2013

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Prepared for:

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Background

- Industrial Economics, Inc. (IEc) is an economics and public policy consulting firm specializing in regulatory impact analysis
- Provided support to NMFS in evaluating the potential economic impacts of the proposed vessel traffic regulations in the context of a Regulatory Impact Review (RIR)
- Worked with expert technical advisors from the UW School of Marine Affairs:
 - Dr. David Fluharty
 - Dr. Daniel Huppert
- Draft RIR made available to the public for comment in July 2009
- Final RIR published in April 2011 updated the analysis and incorporated additional information received through public comment

General Methodology

1. Provide economic context for the regulations
2. Identify number of vessels of each type (e.g., commercial whale watch, commercial fishing, kayak) that may be affected by proposed regulation
3. Estimate average number of passengers per vessel
4. Calculate total individuals affected by each proposed regulation (i.e., alternative) by activity
5. Qualitative evaluation of potential economic impacts that may result from implementation:
 - Regional economic impacts
 - Social welfare impacts

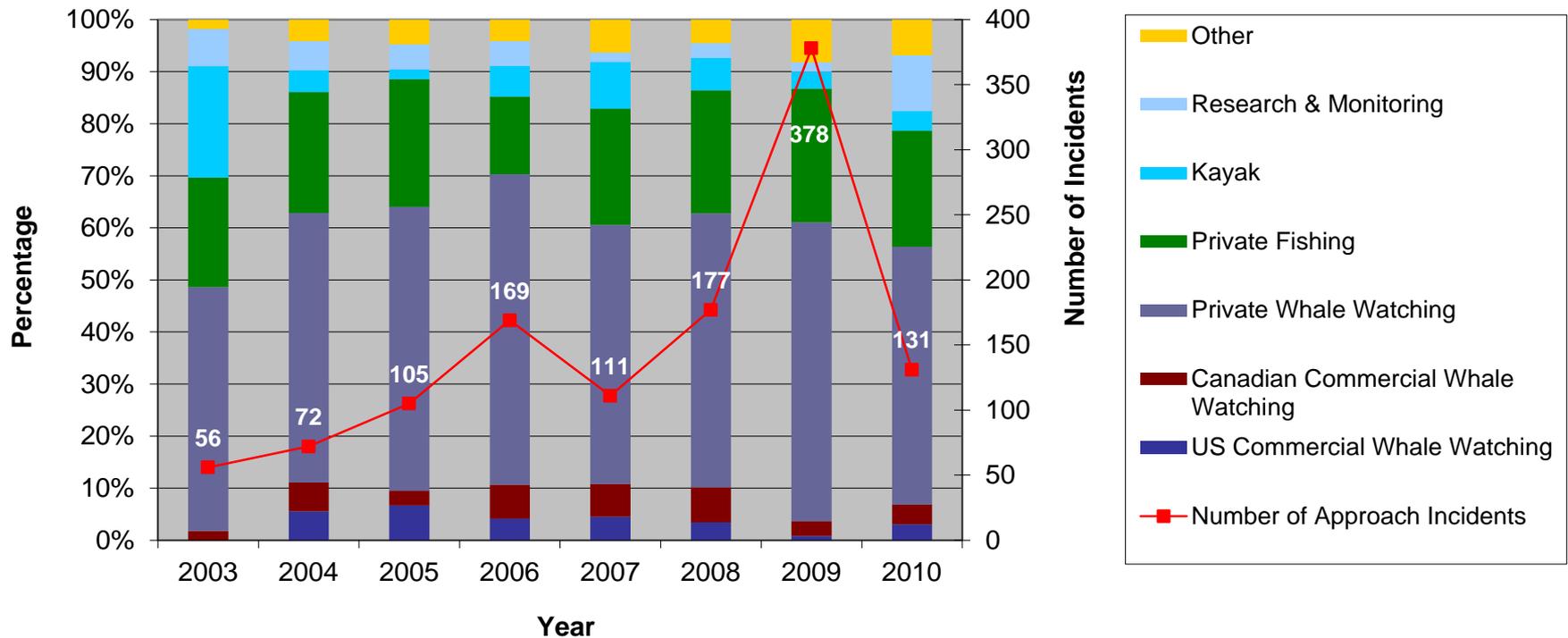
Context for the Regulations

Value of Whale Watching to the Economy

- Approximately 425,000 total whale watchers in Puget Sound in 2008 (65% from out of state)
- Approximately 150,000 sea-based commercial whale watching participants in 2008 departing from U.S. ports (Friday Harbor, Port Townsend, Anacortes, Port Angeles and Bellingham)
- Participants estimated to spend about \$145 per trip on food, lodging, transportation, and other trip costs
- Accounts for \$13.8 million in regional economic activity (estimated for 2008)
- Provides about 200 jobs

Analysis: 200-Yard Approach Limit

Distribution of 100-Yard Approach Incidents by Vessel Type May-September (2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project Final Program Report Data, 2003-2010.

Analysis: 200-Yard Approach Limit

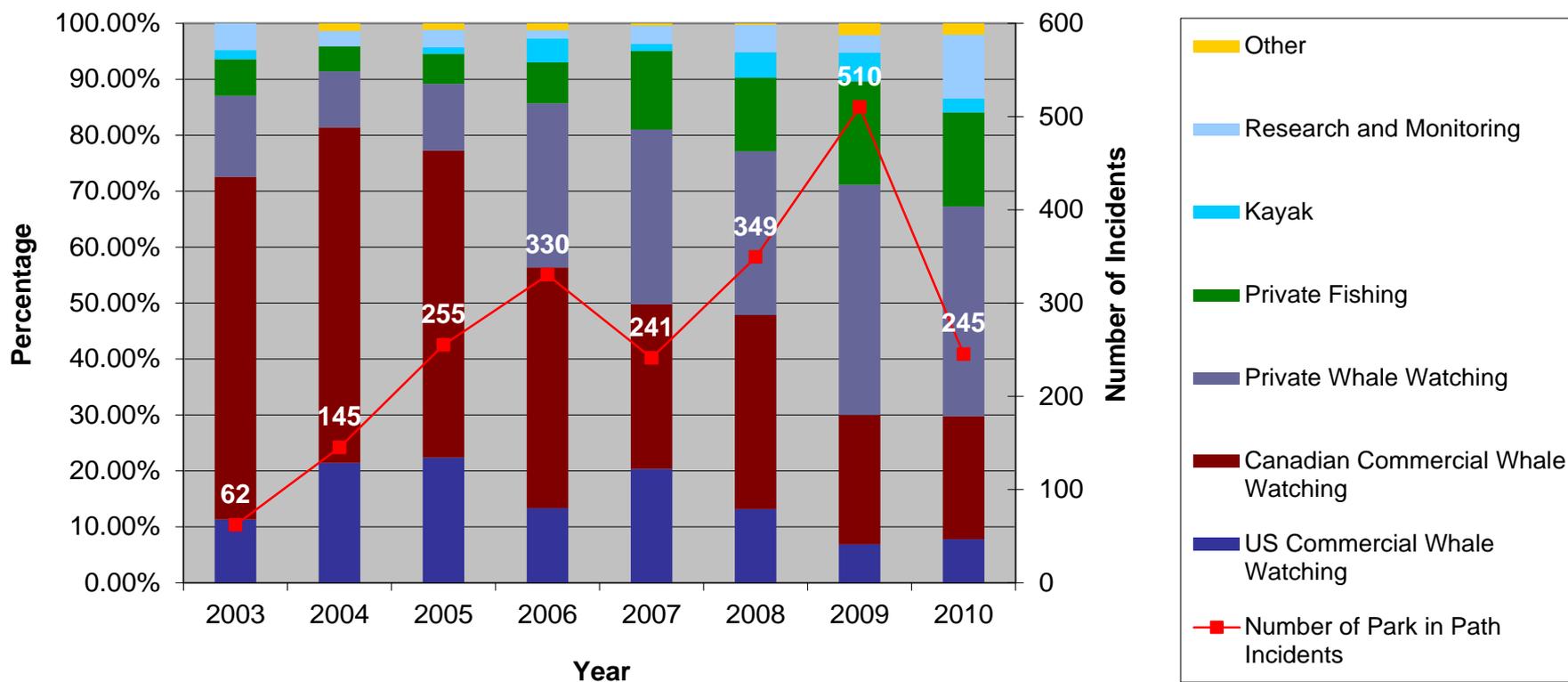
Estimated Number of Individuals Affected Per Year

Category	Avg. vessels w/in 100 yards	Scale to vessels w/in 200 yds	Vessels w/in 200 yds	Average passengers per vessel	Total affected individuals
Commercial whale watch	11.3	454%	51.1	55	2,811
Private*	115.5	353%	407.7	3.4	1,395
Kayak	8.1	137%	11.1	2	22

*Private vessels include recreational vessels engaged in whale-watching, cruising, fishing, etc.

Analysis: Park-in-Path Restrictions

Distribution of Park-in-Path Incidents by Vessel Type May-September (2003-2010)



Source: The Whale Museum. Soundwatch Public Outreach/Boater Education Project
Final Program Report Data, 2003-2010.

Analysis: Park-in-Path Restrictions

Estimated Number of Individuals Affected Per Year

Category	Average vessels violating guideline	Average passengers per vessel	Total affected individuals
Commercial whale watch	131	55	7,205
Private whale watching	85.1	3.4	291
Private fishing	26.5	3.4	91
Kayak	8.6	2	17

Key Assumptions

- Individuals most likely affected are those who will be required to change their behavior as a result of the regulations
- Individuals that were already adhering to the corresponding guidelines would not be affected by the regulation (i.e., no change in behavior means no effect)
- Soundwatch data on observed incidents of non-adherence to guidelines are complete
- The regulation will result in total compliance
- Scaled estimates of affected individuals from the Soundwatch monitoring data using observed vessel distribution data from another study for the 200-yard approach regulation

Potential Economic Consequences

Given these assumptions, a relatively small subset of individuals participating in whale watching and fishing activities are likely to be affected by the regulation:

- **200-yard Approach:** Potentially affected individuals reflects approximately 1.0% of individuals engaged in whale watching in the region
- **Park-in-Path Regulation:** Potentially affected individuals represent approximately 1.8% of all whale watchers in the region

Potential Economic Consequences

Economic Consequences Discussed

- **Welfare effects:** Changes in level of “enjoyment” associated with whale watching experiences (all affected individuals)
- **Regional economic impacts:** Changes in willingness-to-pay for whale watching trips may reduce revenue for whale watching operations and/or reduce spending in the broader regional economy
- **Industry costs:** Increased cost of whale watching operations in the case that the nature of fleet shifts to larger vessels with more passengers to offset approach restrictions

Key Data Limitation to Quantify Impacts

- Relationship between whale watching trip attributes and willingness-to-pay for the activity

Initial Retrospective Review

Individuals Affected by 200-Yard Approach Regulation

Category	Average Annual Individuals (2003-2010)	Potential Change 2011*	Potential Change 2012*
Commercial whale watch	2,685	Substantial increase	Substantial increase
Private whale watch/fishing	1,394	Minor decrease	Substantial decrease
Kayak	22	Minor increase	Substantial increase

* Number of incidents in 2011 and 2012 as compared to the historical average number of incidents. Incidents in 2011 and 2012 fall generally within the normal range of variation observed in prior years.

Initial Retrospective Review

Individuals Affected by Park-In-Path Regulation

Category	Average Annual Individuals (2003-2010)	Potential Change 2011**	Potential Change 2012**
Commercial whale watch	7,205	Moderate increase	Substantial decrease
Private whale watch/fishing	382	Substantial increase	Minor increase
Kayak*	17	NA	NA

* Infractions related to park-in-path cannot be distinguished from approach infractions in 2011 and 2012.

** Number of incidents in 2011 and 2012 as compared to the historical average number of incidents. Incidents in 2011 and 2012 fall generally within the normal range of variation observed in prior years.

Initial Retrospective Review Findings

- Data thus far are insufficient to draw conclusions about the economic impacts of the regulations
- Education/outreach/enforcement efforts take time to affect behavior
- Need additional years of monitoring data to determine trends and account for external factors affecting activity levels
- Need additional types of data to monetize impacts

Data Gaps - Retrospective Analysis

Activity Monitoring Data

- Total levels of relevant activities in the Sound (i.e., fishing, whale watching)
- Continued monitoring, using consistent incident categories, to track changes in behavior (i.e., adherence to the regulations)

Industry Data

- Estimates of annual or monthly ridership/ticket sales (WW)
- Estimates of annual or monthly revenues (WW, commercial fishing)
- Costs of changes in infrastructure or other direct costs on operations (e.g., need for vessel upgrade/retrofit) (WW)

Survey of Whale Watch Participants

- Economic survey to estimate demand for whale watching as a function of trip attributes (examine changing experience of repeat customers pre- and post-regulations)

Analysis of “No-Go Zone” Alternatives

Methodology

Motorized Vessels

1. Identify seasonal average number of vessels within voluntary no-go zone
2. Multiply affected vessels by average number of passengers
3. Identify potential changes in behavior that could result in economic impacts

Human-powered Vessels

1. Identify seasonal average number of vessels using County launches
2. Multiply affected vessels by average number of passengers
3. Identify potential changes in behavior that could result in economic impacts

Analysis of “No-Go Zone” Alternatives

Incidents of Vessels within No-Go Zone Areas

Category	Existing, Voluntary No-Go Zone	Expanded No-Go Zone
Motorized Vessels		
Commercial Whale Watch	2,458 individuals	5,382 individuals
Other (private)	187 individuals	509 individuals
Commercial fishing trip	Unknown	>212 trips
Non-Motorized Vessels		
Commercial Excursion	6,900 individuals	Unknown
Private Excursion	1,131 - 2,722 individuals	Unknown

Potential Economic Consequences of Regulatory “No-Go Zone”

Economic Report Results

- Specific economic impacts unknown
 - Extent to which willingness to pay for trips is related to travel distance, proximity to whales in no-go zone, and boat launch access is unknown
 - Relative attractiveness of substitute sites, and therefore potential effect on participation, is unknown
- Other potential impacts
 - Vessel crowding at edge of closure
 - Increased crowding at land-based viewpoints (also potential increased enjoyment of shore-based viewing due to reduced density of vessels near whales)

San Juan County Analysis Results

- Assumes current kayak tourists forgo visit to region entirely:
 - 10,000 kayakers forgo trips to region
 - \$6.5 million in lost income annually
 - 50 percent (5) local outfitters out of business

Data Gaps for Additional Analysis of No-Go Zone

- Annual counts of vessels in the No-Go Zone areas during whale watching season:
 - Soundwatch monitoring data not collected continuously and not focused specifically on areas included in No-Go Zone alternatives
 - Historical Soundwatch data do not differentiate “other vessel categories,” including commercial fishing vessels
- Survey of whale watch participants comparing relative willingness-to-pay for trips within the No-Go Zones versus outside of these areas
- Survey of whale watch participants to determine level of migration from water- to shore-based viewing, and relative preference for these methods of viewing

Data Gaps for Additional Analysis of No-Go Zone, cont'd

- Industry data from whale watching and commercial fishing trips:
 - Frequency of trips to No-Go Zone areas absent additional regulation
 - Estimated revenue/catch associated with these trips
 - Estimated difference in revenue/catch associated with trips to alternative locations during whale watching season