

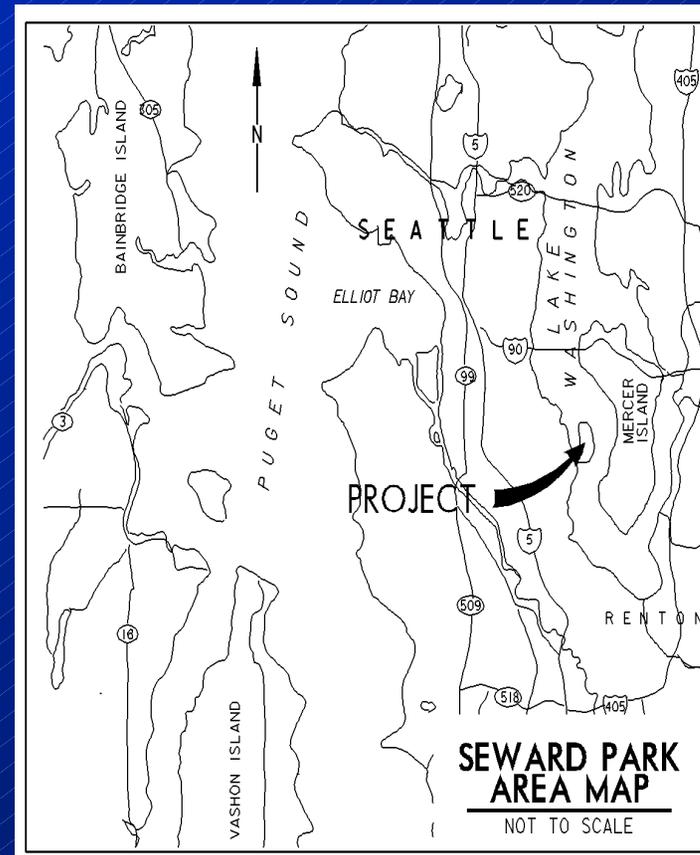
Seward Park Rehabilitation Study:
Juvenile salmonid use of shoreline
habitats in Seward Park,
King County, WA



Presented by Dean G. Paron
Seattle District U.S. Army Corps of Engineers

Study Area

- In the fall of 1999, the USACE began the Seward Park Rehabilitation study with the city of Seattle under Section 22 Program of the 1974 Water Resources Development Act.



Objective

- To identify potential areas along the shoreline habitat and the shoreline of Seward Park that could be rehabilitated to provide habitat to juvenile and adult salmonids.



Scope of Study

- Utilize snorkel surveys and beach seines to identify fish presence and/or utilization of nearshore habitats
- Collect depth and substrate information from nearshore areas
- Collect vegetation information from shoreline areas
- Conduct spawning surveys to identify potential beach utilization by adult salmonids
- Review literature on aquatic studies in the area and the effects of bank protection projects on fish habitat utilization



Project Area



Juvenile Salmonid Use of Shoreline Habitats in Seward Park



USACE Seattle District
Environmental Resources Section

Methods

- Snorkel Surveys:
 - 2 divers at each site
 - snorkel sites 50 x 15 m
 - direct enumeration procedures used to count fish
 - unit divided into equal transacts (50m x 7.5m)
 - divers swam in the same direction, paralleling the shoreline
 - fish identified by species and size class
 - surveys conducted during both daylight and night hours once a month from August 1999 - August 2000

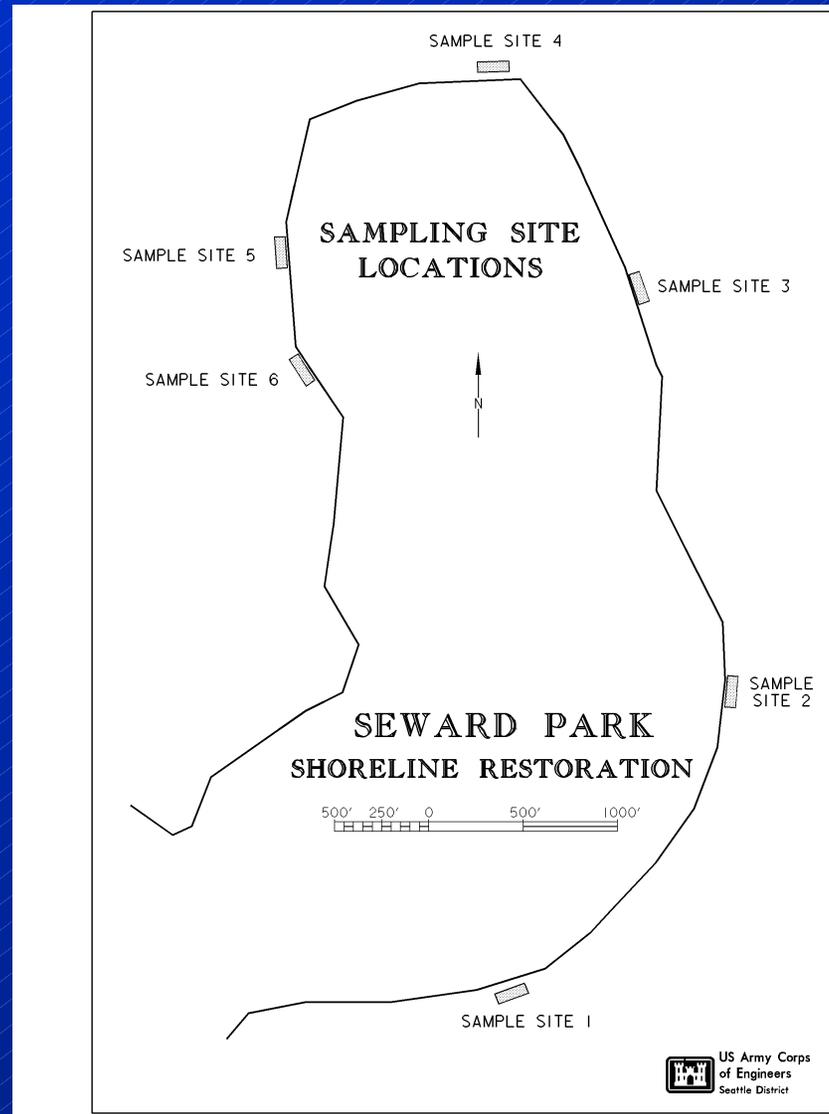


Site Classifications

- Shoreline delineated by:
 - Bank protection
 - Bank vegetation
 - Overhead vegetation
 - Slope
 - Substrate



Sampling Site Locations



Site #1

- Concrete Bulkhead
- Little shoreline vegetation
- Milfoil and waterweed 10m from shoreline
- Substrate 80% large gravel and 20% cobble
- Large cement blocks scattered throughout



Site #2

- Terrestrial vegetation overhangs 2-3m
- Milfoil is present 10m off the shoreline with some waterweed
- Substrate is 50% mix of gravel and cobble, with some sand 2m off the shoreline



Site #3

- Mowed grasses and blackberry
- Milfoil is 10m offshore, while nearshore substrate is angular quarry spalls
- 50% mix of sand and cobble beyond 3m



Site #4

- Shoreline vegetation absent
- Milfoil 10m from shoreline
- Nearshore substrate gravel, while the offshore substrate consists of a 50% mix of sand and cobble



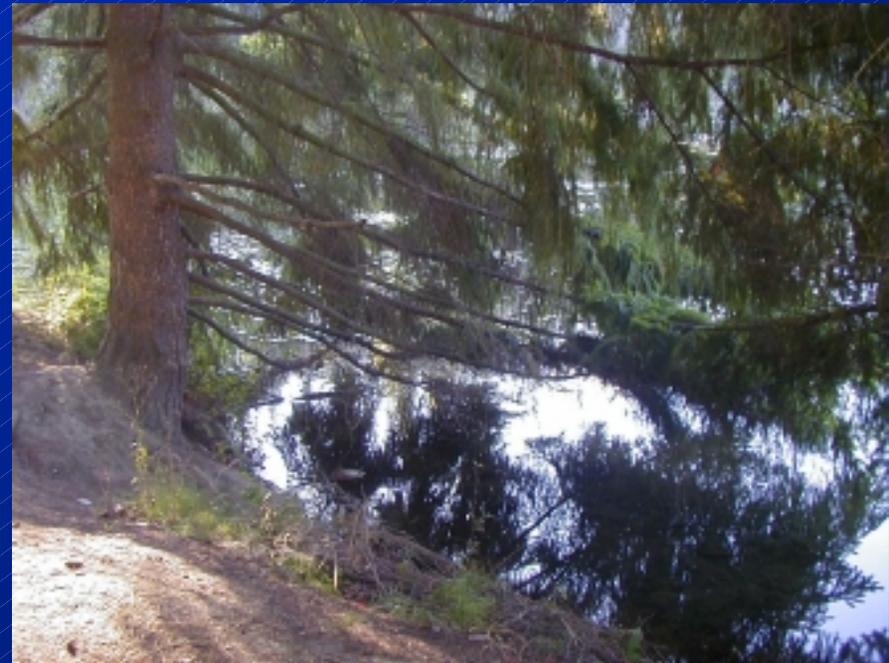
Site #5

- 95% blackberry and 5% willow
- No overhanging veg.
- Nearshore substrate is comprised of 95% gravel and 5% sand
- Offshore substrate is 60% gravel and 40% sand



Site #6

- Big leaf maple, willow, blackberry, alder, and snowberry
- Mature Douglas fir and willows 2-3 m over waters edge
- Nearshore substrate consists of quarry spalls, offshore a 50% mix of cobble and sand



Results



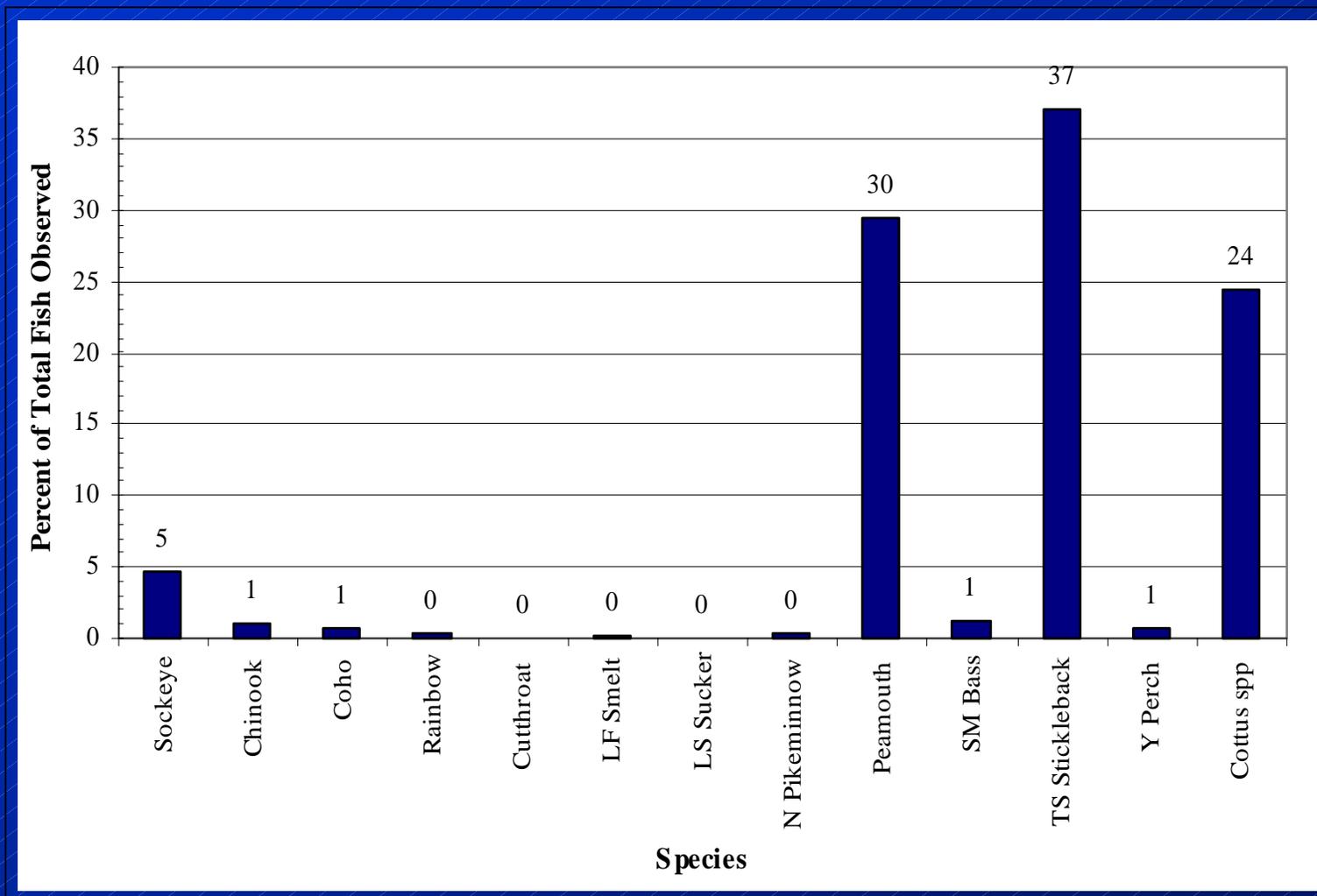
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Juvenile Salmonid Use of Shoreline Habitats in Seward Park

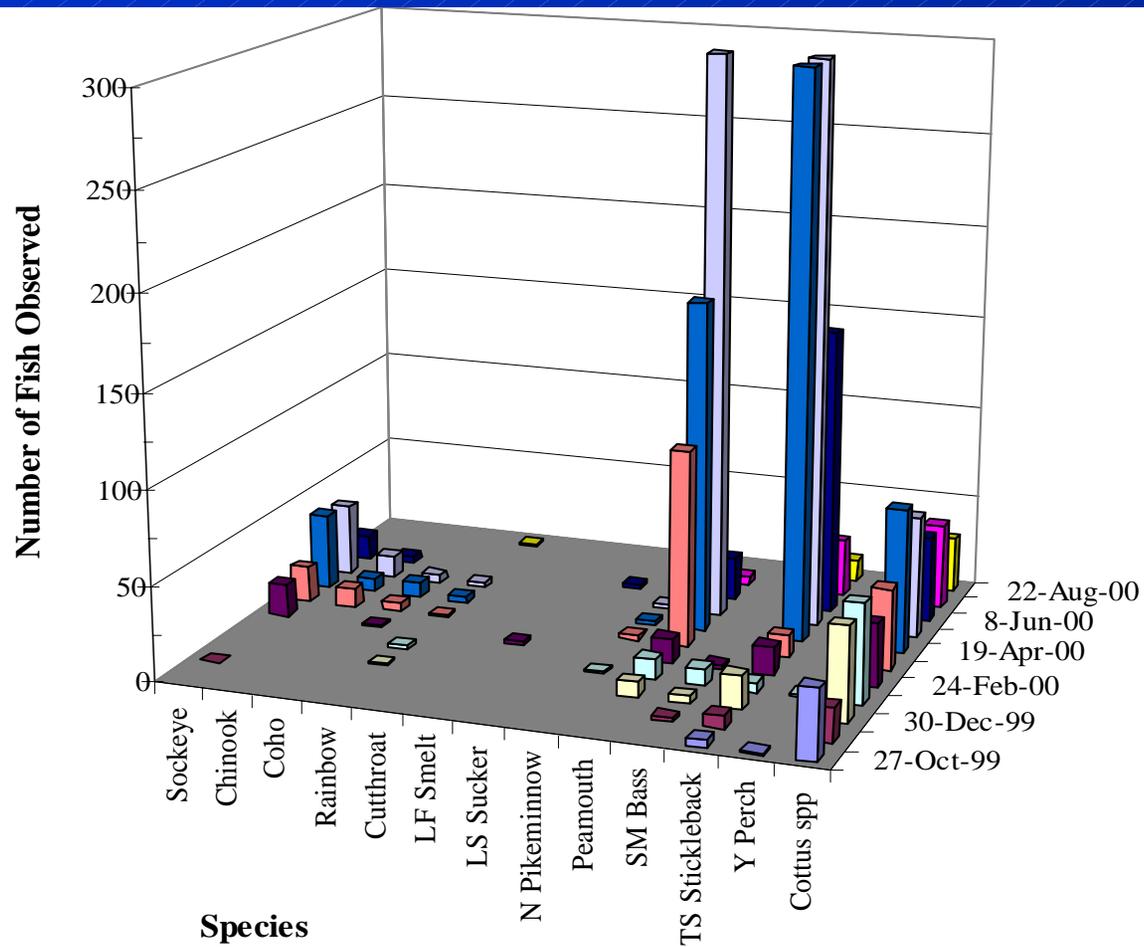


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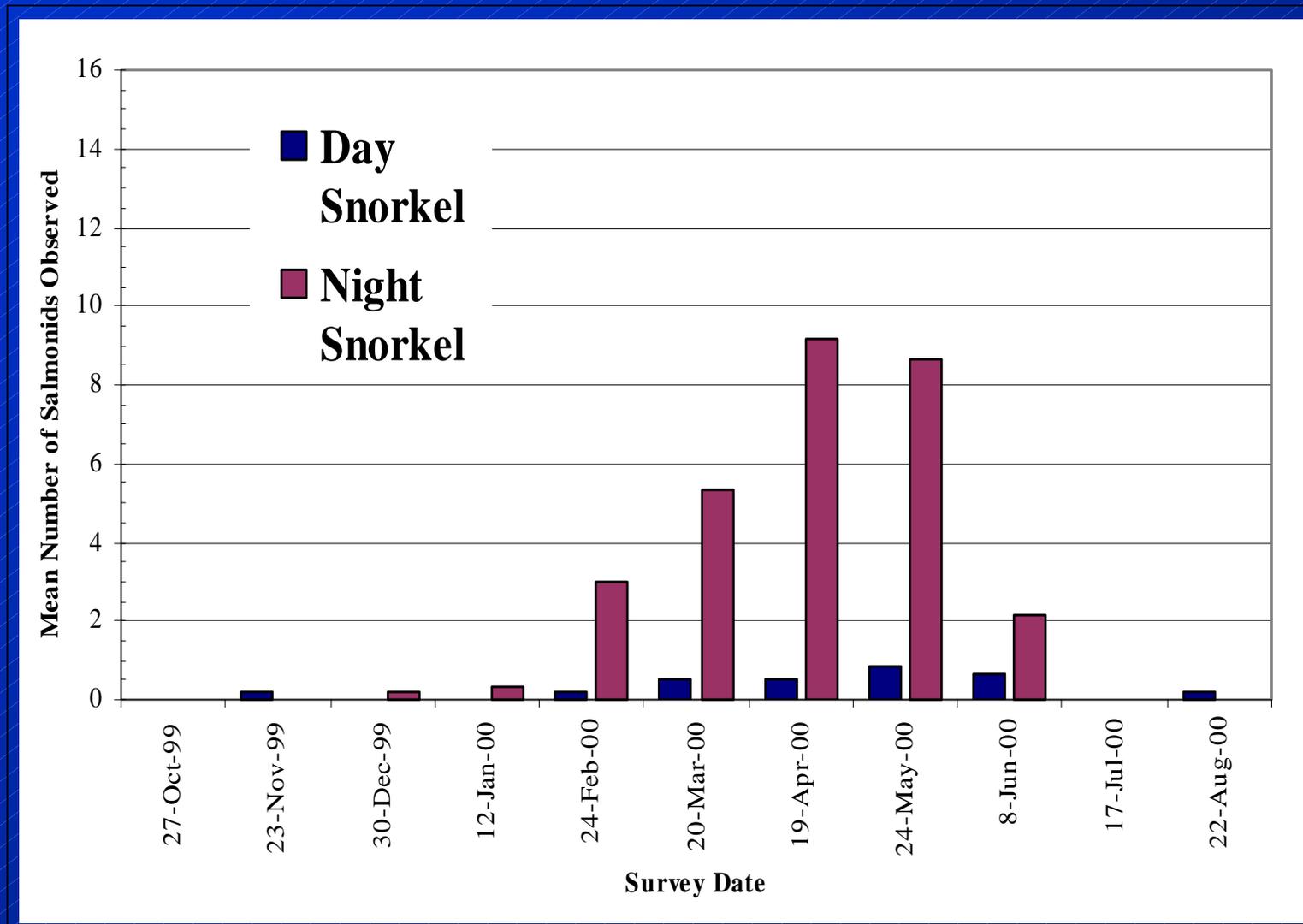
Frequency of Occurrence of Fish Species Observed During Paired Snorkel Surveys Conducted Along Seward Park King County, WA 1999-2000



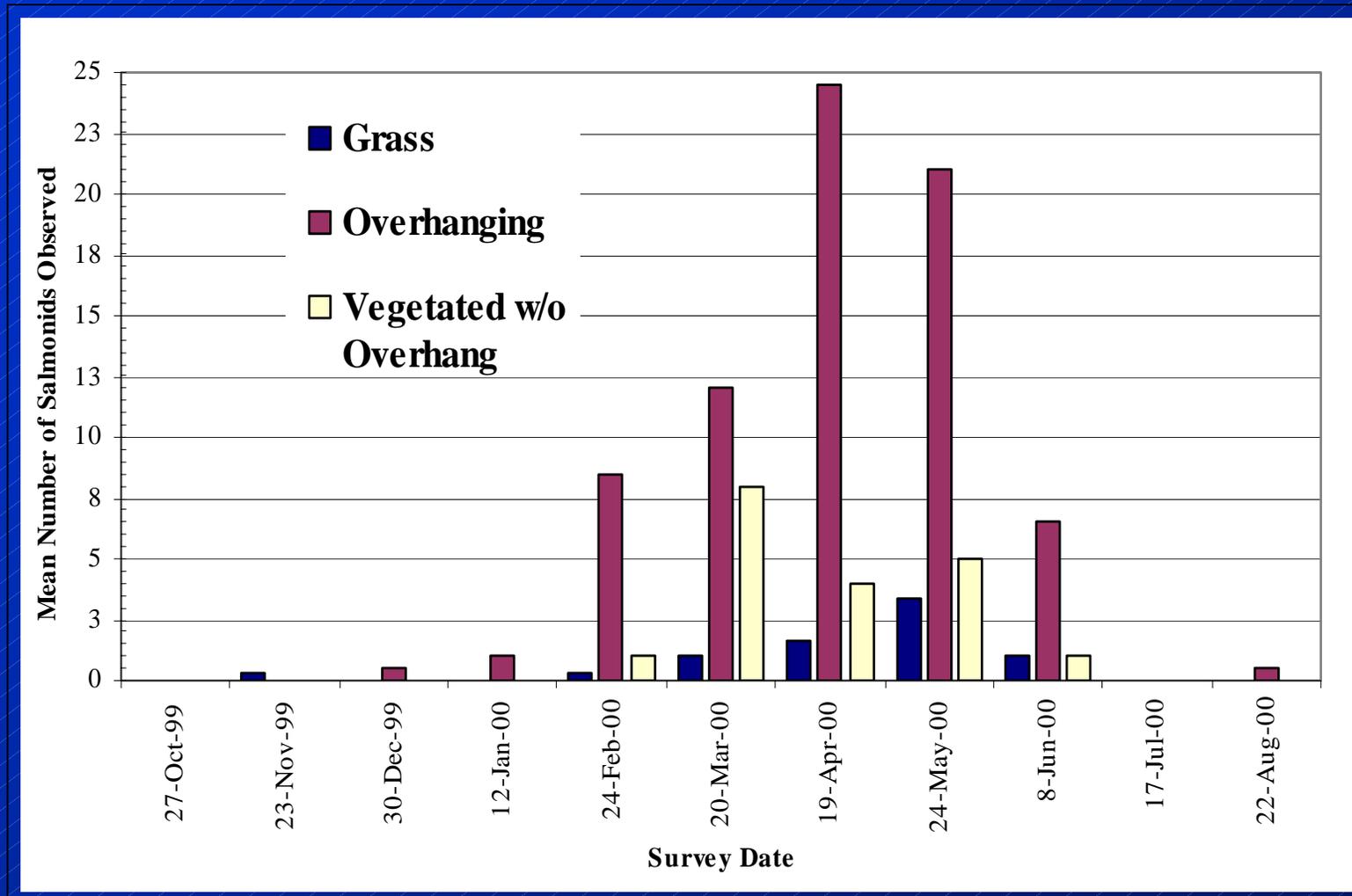
Number of Fish Observed During Paired Snorkel Surveys at Seward park, 1999-2000



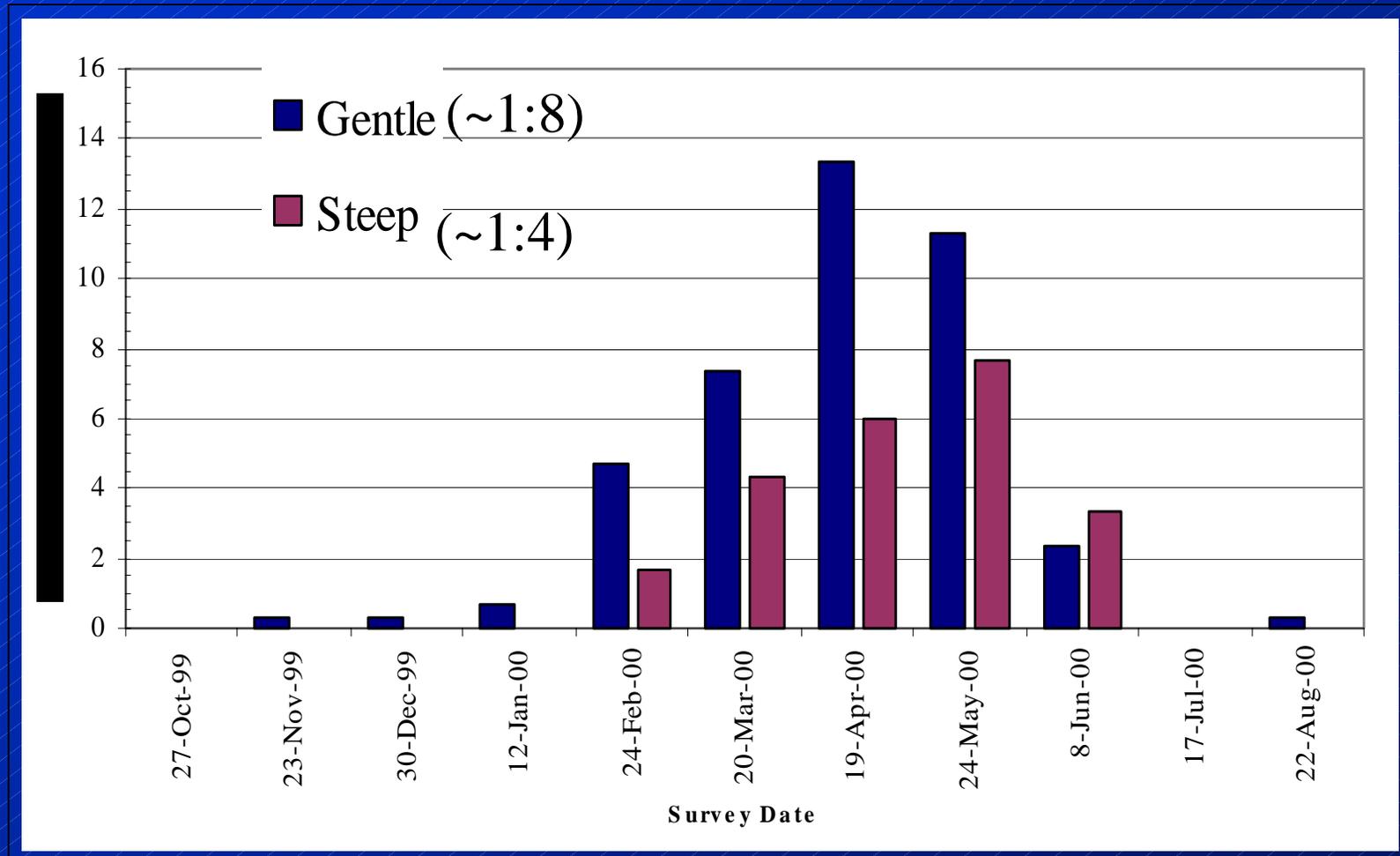
Mean Number of Juvenile Salmonids Observed During Day and Night Snorkel Surveys



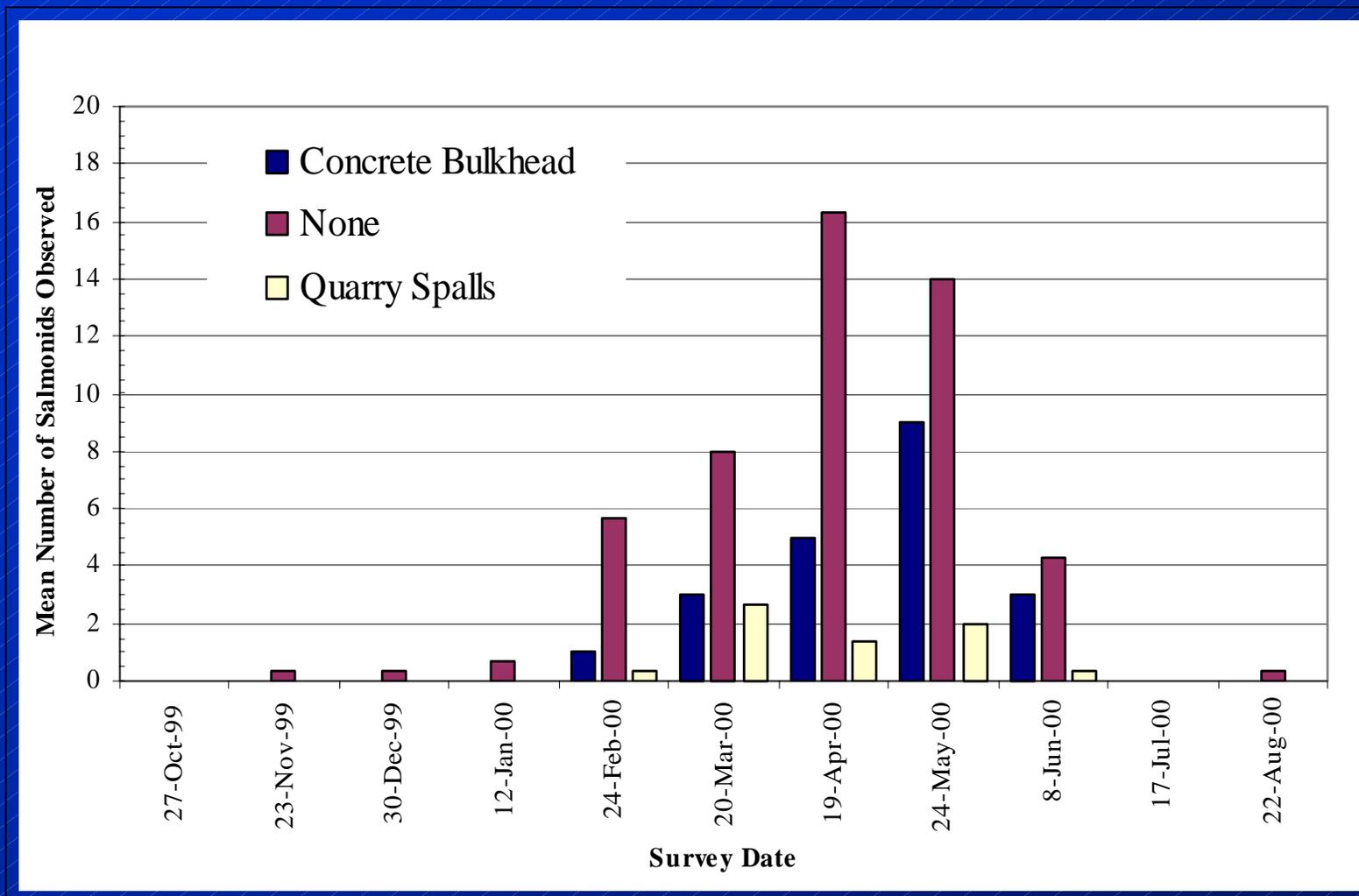
Mean Number of Juvenile Salmonids Observed at Sites with Different Bank Vegetation



Mean Number of Juvenile Salmonids Observed at Sites With Varying Slopes



Mean Number of Juvenile Salmonids Observed at Sites with Different Bank Protection Classifications



Conclusions

- Surveys found the highest use of the shoreline by juvenile salmonids along shoreline sections with:
 - overhead cover
 - shallow-sloping banks
 - banks without armoring



Future Studies

- Future studies will investigate substrate modification and juvenile salmonid use.



Acknowledgements

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&

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Questions?

- For further information on this project, the complete report can be viewed at:

<http://www.nws.usace.army.mil/ers/Monitoring.cfm>

