ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

OREGON
Fish & Wildlife

TO: Interested Colleagues

FROM: Chris Prescott

SUBJECT: Lents Fish Salvage

DATE: September 14, 2006

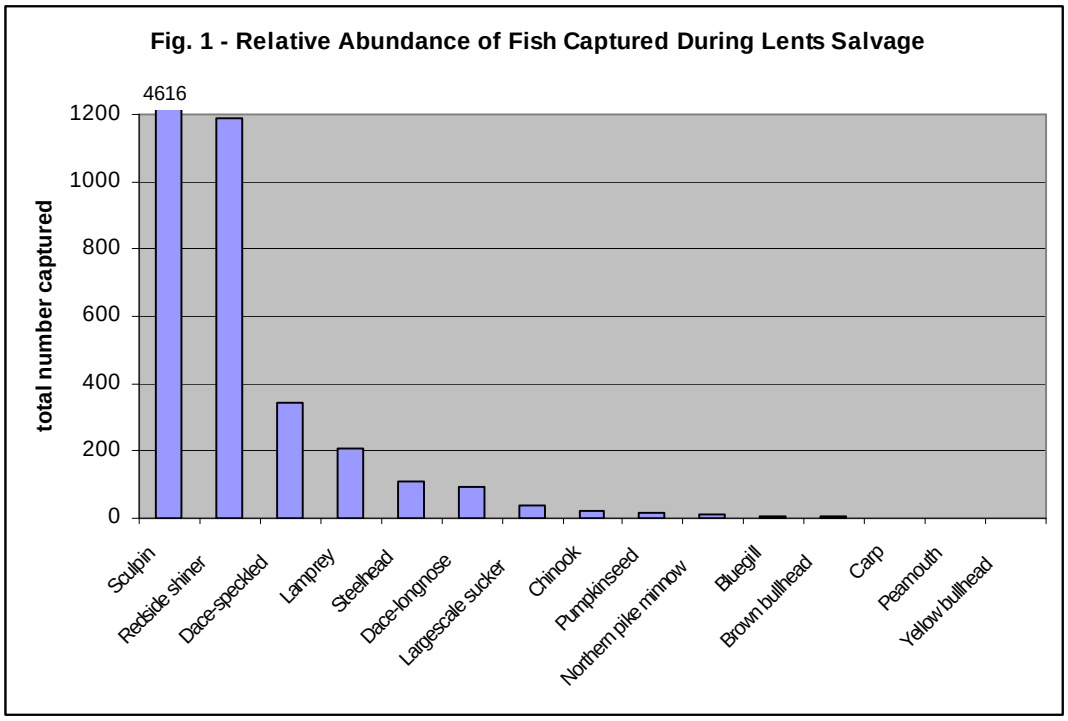
Recently the Oregon Department of Fish and Wildlife (ODFW) and the City of Portland conducted a fish salvage from June 1-15th at Lents Crossing in preparation for the stream dewatering needed to work on the sewer pipe. Carefully planned and monitored stream dewatering events such as this provide excellent opportunities to assess fish communities in streams. In general, fish communities are very difficult to sample. While electroshocking, seine nets and other methodologies are excellent, time-tested approaches for assessing fish communities, they do not provide a complete census of a sampled reach because of factors such as the number of hiding places in streams and differential susceptibility to capture with size and species. Fish salvage and monitoring in conjunction with stream dewatering provides one of the most complete and accurate non-lethal methods of determining the number and relative abundance of fish species within a stream reach.

In reviewing the results from the salvage efforts I was impressed with the fact that these results are both consistent with the growing body of fish monitoring information we have been collecting on Portland's watersheds, yet also provide new insights that expand our knowledge of these fish communities. I wanted to emphasize a couple of these points below.

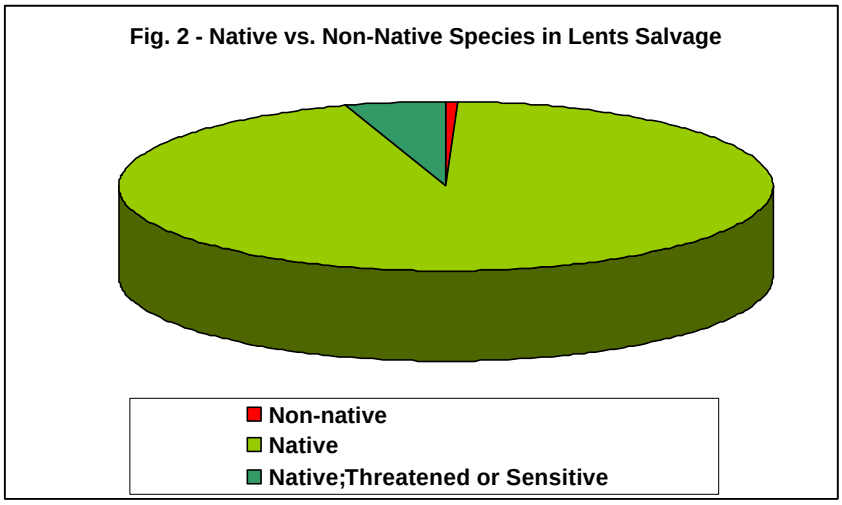
As with many of our urban watersheds, Johnson Creek provides important habitat for a number of threatened, sensitive and native species. The original ODFW Tributary Study (Tinus *et al.* 2003) documented the presence of salmonids and lamprey through many of our local watersheds, and subsequent monitoring efforts have continued to highlight this fact. The Lents Salvage effort provides new insight into the importance of the habitat our local watersheds provide, and the importance of threatened and sensitive species as constituents of local fish communities. Along an 1800-foot stream reach, 206 lamprey, 107 steelhead trout and 23 Chinook were recovered. While sculpin and redside shiner were far and away the must abundant species, lamprey and steelhead were the fourth and fifth most abundant species, respectively, of the 17 total fish species captured (Fig. 1; Table 1). Even Chinook – the least abundant of the sensitive species we found – were more abundant than any of the non-native species collected at the site. While salmonids and lamprey have suffered precipitous declines from historical population levels, their relative abundance suggests they are still important components of the fish community.

In spite of extreme habitat alterations and pervasive long-term invasion by non-native fish species across the region, native species still dominate our local fish communities. One of the more surprising results of the ODFW Tributary Study was that non-native fish species were a

relatively small numerical component of fish communities within the tributaries: non-natives comprised approximately three percent of the total number of fish captured. The results from the Lents Salvage were even more remarkable: while five of the 17 species were non-native, only 0.5% of the total number of fish captured were non-natives (Fig. 2). This is in marked contrast to the Willamette mainstem, where approximately half the species are non-native. There are no passage barriers on the Johnson Creek mainstem, so these species certainly can access Lents Crossing and the areas ODFW monitored, but for reasons we don't yet understand native fish – including salmonids and lamprey – continue to outnumber non-natives in spite of severely altered habitat and the greater resistance of many non-natives to these altered conditions.



It is important to emphasize that this does not mean that the presence of non-native fish species is not a threat to native fish in Johnson Creek. Once non-natives are established in a system they are difficult or impossible to eradicate completely, and if past trends of habitat destruction and salmon decline continue these invasive species may become increasingly dominant and problematic. In addition, one large carp may have the impact of many smaller fish. What this and the previous result do emphasize is that threatened native species continue to hold on even within the most urbanized watersheds in the Columbia Basin, and that our protection and restoration efforts can provide a valuable contribution to recovering these populations.



There are more threatened and sensitive species in our local watersheds than our existing monitoring information suggests. The Lents dewatering event provides the opportunity to compare our routine monitoring approaches (single-event electroshocking or seining) to a complete census that more completely and accurately estimates the fish communities in the stream (repeated sampling during drawdown and dewatering). The results from this one event suggest that our routine monitoring methods do provide valuable assessments of species presence and spatial and temporal patterns of distribution, but that they significantly underestimate the diversity and absolute abundance of fish. In other words, our routine monitoring approach does a good job of telling us what fish are out there and where and when they occur, but there are far more fish in these streams than are captured in routine monitoring.

During the salvage we performed multiple passes of each area with the electroshocker, and continued to sample each area on multiple consecutive days. Over this time water levels were drawn down so that fish were more concentrated and had smaller areas to hide, increasing the effectiveness of electroshocking. Rather than capturing the greatest number of fish on the first day and subsequently fewer fish each day – suggesting that our initial efforts captured most of the fish community and subsequent days were capturing the few that managed to avoid capture initially – the numbers of fish captured increased until reaching a maximum on the fourth day, at which point the numbers dropped precipitously (suggesting we *finally* after four multiple pass, multiple shocking team days, had captured and rescued the vast majority of the fish). This pattern was particularly true for sensitive or threatened species such as salmonids and lamprey (Fig. 3). Dewatering events are severe disturbances to the stream and should only be used as a last resort where other options are not available, but when these events are required we should take full advantage of the unique opportunity to assess fish community characteristics such as density, relative and community structure that are difficult or impossible to acquire through routine monitoring..

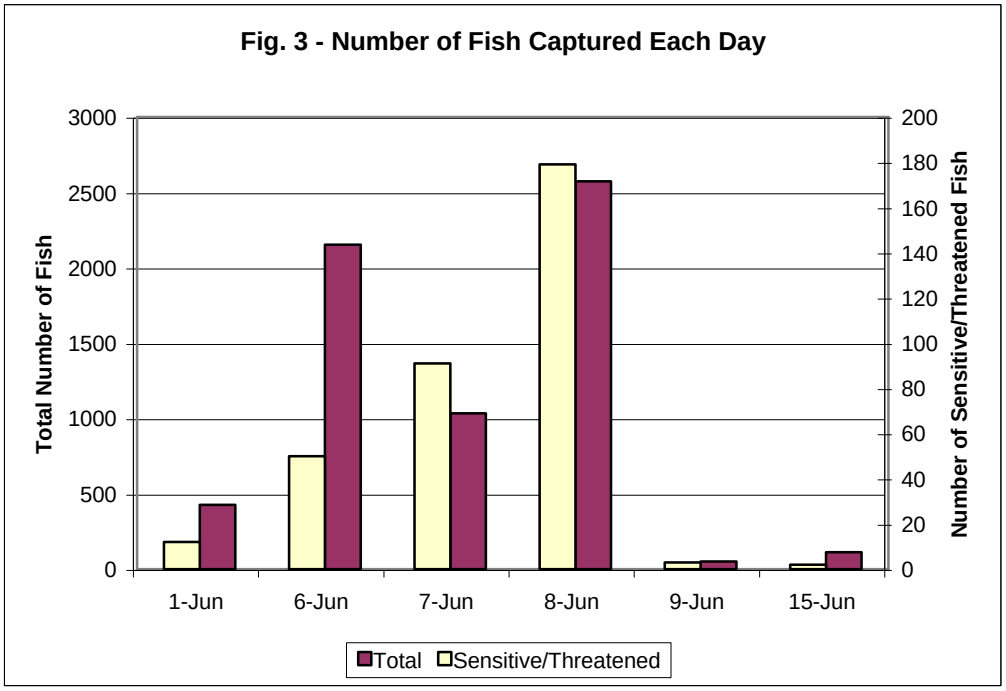


Table 1 – Fish Counts from the Lents Salvage.

Lents Fish Salvage Summer 2006 (as of 6-26-06)

Species (common name)	6/1/2006	6/6/2006	6/7/2006	6/8/2006	6/9/2006	6/15/2006	Total count	Mortality
Bluegill		1	2	2			5	
Brown bullhead			2	2			4	
Carp		1					1	
Chinook		4	4	15			23	3
Dace-longnose	3	39	27	25		1	95	1
Dace-speckled	69	131	103	33	3	7	346	3
Largescale sucker	5	5	5	22			37	1
Lamprey	1	30	53	119	3		206	
Northern pike minnow		2		8			10	
Peamouth				1			1	
Pumpkinseed		5	5	8		1	19	
Redside shiner	24	216	248	642	4	54	1188	16
Sculpin	391	1770	712	1646	46	51	4616	1
Steelhead	11	16	34	44		2	107	9
Rainbow Trout*				1			1	
Yellow bullhead			1				1	
Total Fish							**6660**	
Crawfish		150	38	241		2	431	
Pacific giant salamander		1				4	5	
Grand total							**7096**	

* - The rainbow trout was differentiated from steelhead based on size

Literature Cited

E. S. Tinus, J. A. Koloszar and D. L. Ward. 2003. Abundance and distribution of fish in City of Portland streams. Prepared for the City of Portland. http://www.portlandonline.com/shared/cfm/image.cfm?id=51651