Cruise Report for the
Surface Waters Ambient Monitoring Program (SWAMP) Bioaccumulation of Contaminates in Sport Fish in Lakes and Reservoirs
located within the Colorado River Basin
for the
Colorado River Basin Regional Water Quality Control Board (RWQCB 7)

Sampling dates: September to December 2014

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Updated:

1.0 Introduction

This report describes the sampling activities of the popularly fished water bodies in the Colorado River Basin for the bioaccumulation of contaminants in fish tissue. Fish were collected from water bodies with guidance from the Office of Environmental Health Hazard and Assessment (OEHHA) and the Colorado River Basin Regional Water Quality Control Board (RWQCB7). The State Water Quality Control Board (SWQCB) work was authorized via FY 13-14 in support of Work Order SJSURF-13-7-002. The work for the FY 13-14 SWAMP SWQCB collection effort is a human health screening study that focuses on the beneficial use of fish from water bodies within the Colorado River Basin.

2.0 Cruise Report

2.1 Objectives

Objectives were to collect popular species of sport fish from fourteen water bodies in the Colorado River Basin. The water bodies were selected by the RWQCB7 based on fishing pressure and the amount of subsistence fishing. OEHHA then generated a list of sport fish that were based on their desirability to fisherman and their ability to reflect potential tissue levels of bioaccumulating contaminates. All the sport fish on the list were targeted for each water body by boat or hiking to "specie-specific" habitats with traps, electro fishing boats, fyke nets, gillnets, hook n line and cast-nets. Each targeted species had multiple individuals collected from each water body to be analyzed as individuals or composites as directed from RWQCB7 in Work Order No. SJSURF-13-7-002.

2.2 Sampling personnel

Billy Jakl MPSL/CDFW	Crew Lead
Dylan Service MPSL/CDFW	Crew Lead
Gary Ichikawa MPSL/CDFW	Crew Lead
Sean Mundell MPSL/CDFW	Research Tech
Jon Goetzl MPSL/CDFW	Research Tech

2.3 Authorization to collect samples

All sampling personnel are MPSL staff (through San Jose State University Foundation) contracted through CDFW to conduct the sample collection activities listed herein. The funding and authorization to collect the samples described herein is contained in the State Water Resources Control Board (SWRCB) Work Order SJSURF-13-7-002.

2.4 Station selection and reconnaissance

MPSL staff conducted the pre-sample collection reconnaissance activities by locating access points and popular fishing areas within water body. Popular fishing areas were determined from local knowledge and desktop reconnaissance. After reconnaissance, multiple areas were identified within each water body. RWQCB7 authorized all water bodies for fish collection and for specific types of tissue analyses as set forth in the Work Order SJSURF-13-7-002.

2.5 Summary of types of samples authorized to be collected

A total of fourteen water bodies were authorized for sample collection effort, in order to assess the bioaccumulation of contaminants in fish tissue. OEHHA generated a list of target fish species for each water body based on what species are commonly caught and consumed by anglers and that are good indicators of mercury, synthetic organics or selenium bioaccumulation. Each water body had five to seven species chosen based on their ability to best indicate the above parameters. Top predatory species (ex. largemouth bass or striper) were targeted because mercury is biomagnified in muscle tissue. Bottom-feeders (ex. carp or catfish) were targeted due to their high lipid content which bio-accumulate organics. Analysis authorization dictates tissue compositing and analysis (QA/QC requirements-preservatives, aliquoting, cooling, etc.).
Physical parameters were collected for each fish, which included: weight, total length, fork length, sex and presence of any abnormalities. A cross-section (~10cm) steak of tissue was collected from behind the head and was then wrapped in aluminum foil and placed in a zipper-closure bag and stored on dry ice for the duration of the trip. At the MPSL/DFW lab, samples were stored in a freezer until they were processed for authorized analysis, per appropriate SOP's.
Scales were collected from black bass species for age growth analysis used in an age regression with mercury concentration. Black bass species were used for this analysis due to their high correlation of age to mercury concentration.

2.6 Discussion

Boat problems and bad weather were major factors in our ability to sample each water body effectively. Also, low water levels made boat access difficult/impossible in the New and Alamo Rivers. A special thanks to the Imperial Irrigation District for the use of a crane and an operator. They allowed us to access the two of the three locations in the All American Canal.

2.7 Results

All fourteen water bodies were sampled for fish in order to assess the bioaccumulation of contaminants in fish tissue. Some target species were not seen during sampling efforts and were replaced with similar species.

2.8 Description of sample collection stations

Multiple CDFW/Marine Pollution Studies Laboratory teams sampled the authorized water bodies during October to December, 2014. The table (See below) lists the water bodies sampled. The list is linked to maps of the sampling effort for each water body, the sampling crew, station name, date, species collected and occurrences at each station.

Table 1
The list of stations sampled in various water bodies.

Collection Method: Cast Nets, Yo Yo Fishers, Hook-N-Line
Date of Collection: 12/2, 12/3, 12/8, 12/9, 12/10/2014
Sample Crew: Billy Jakl, Dylan Service

Common Carp									
Total Length (mm)	325	546	558	591	603	611	618	622	654

Tilapia spp.					
Total Length (mm)	220	232	233	288	321

Channel Catfish	
Total Length (mm)	424

Largemouth Bass		
Total Length (mm)	206	391

Flathead Catfish	
Total Length (mm)	653

Comments: High conductivity and low flows made collection impossible with the Eboat. Samplers used every other method possible to collect the target species.

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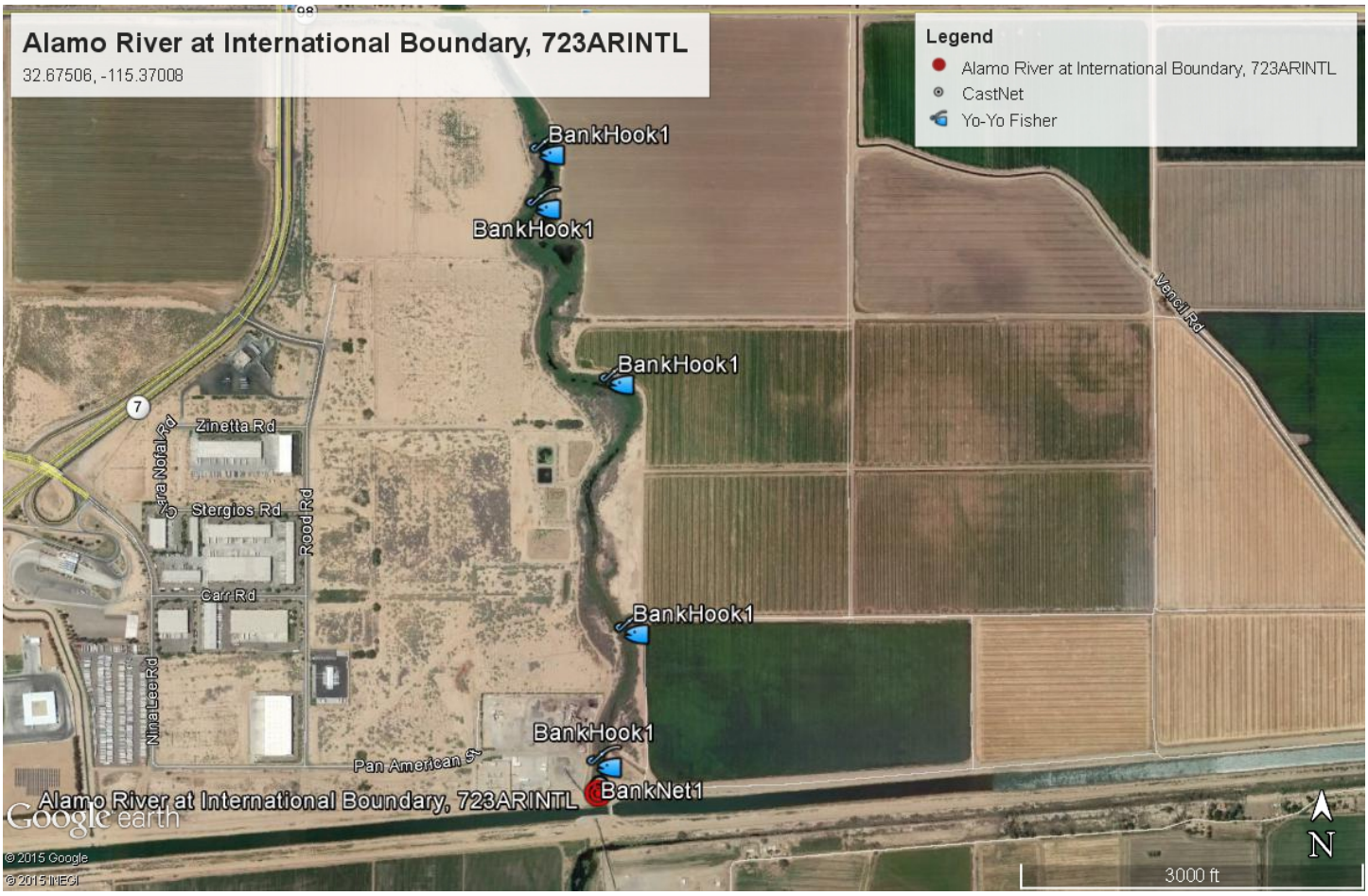

Collection Method: Cast Nets, Yo Yo Fishers, Hook-N-Line
Date of Collection: 11/17/2014, 11/18/2014
Sample Crew: Billy Jakl, Dylan Service

Bluegill						
Total Length (mm)	122	127	127	130	141	
Tilapia spp.						
Total Length (mm)	175	181	183	186	191	195

Comments: Multiple methods were used to collect more target fish species, but low water level and limited access to the river bank made collect very difficult.

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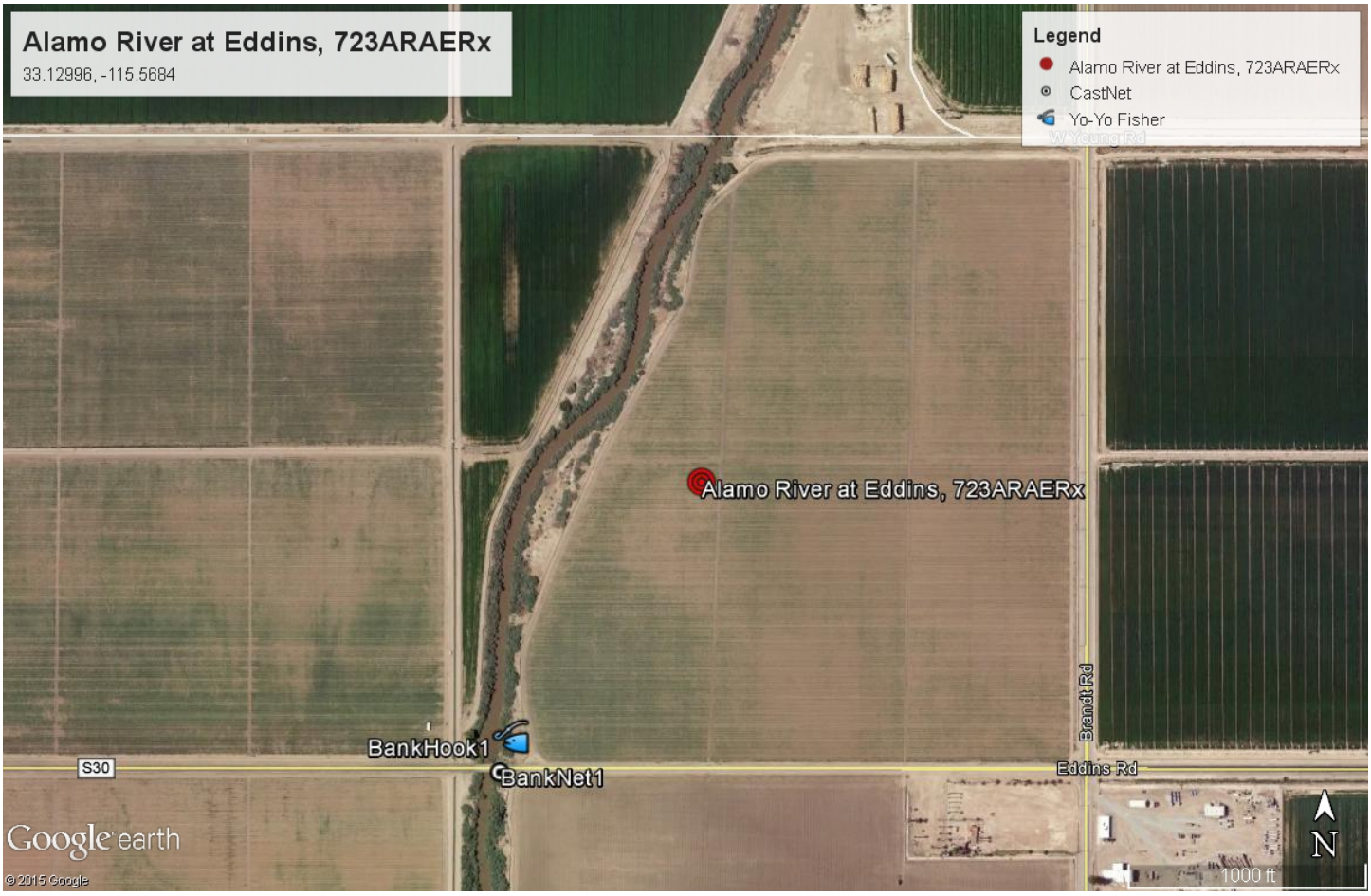

Collection Method: Yo Yo Fishers, Cast nets
Date of Collection: 11/19/2014
Sample Crew: Billy Jakl, Dylan Service

Comments: Samplers placed four Yo-Yo fishers and threw cast nets several times, but no fish were collected at this site.

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Collection Method: Cast Nets, Yo Yo Fishers, Hook-N-Line
Date of Collection: 12/2/2014, 12/3/2014
Sample Crew: Billy Jakl, Dylan Service

Tilapia spp.						
Total Length (mm)	202	234	238	244	248	260

Common Carp	
Total Length (mm)	**609**

Comments: High conductivity and low flows made collection impossible with Eboat. A dirt ramp was cut into the bank upstream of the bridge, but the low water level made the ramp unusable. All the fish listed in the table were collected at the dirt ramp.

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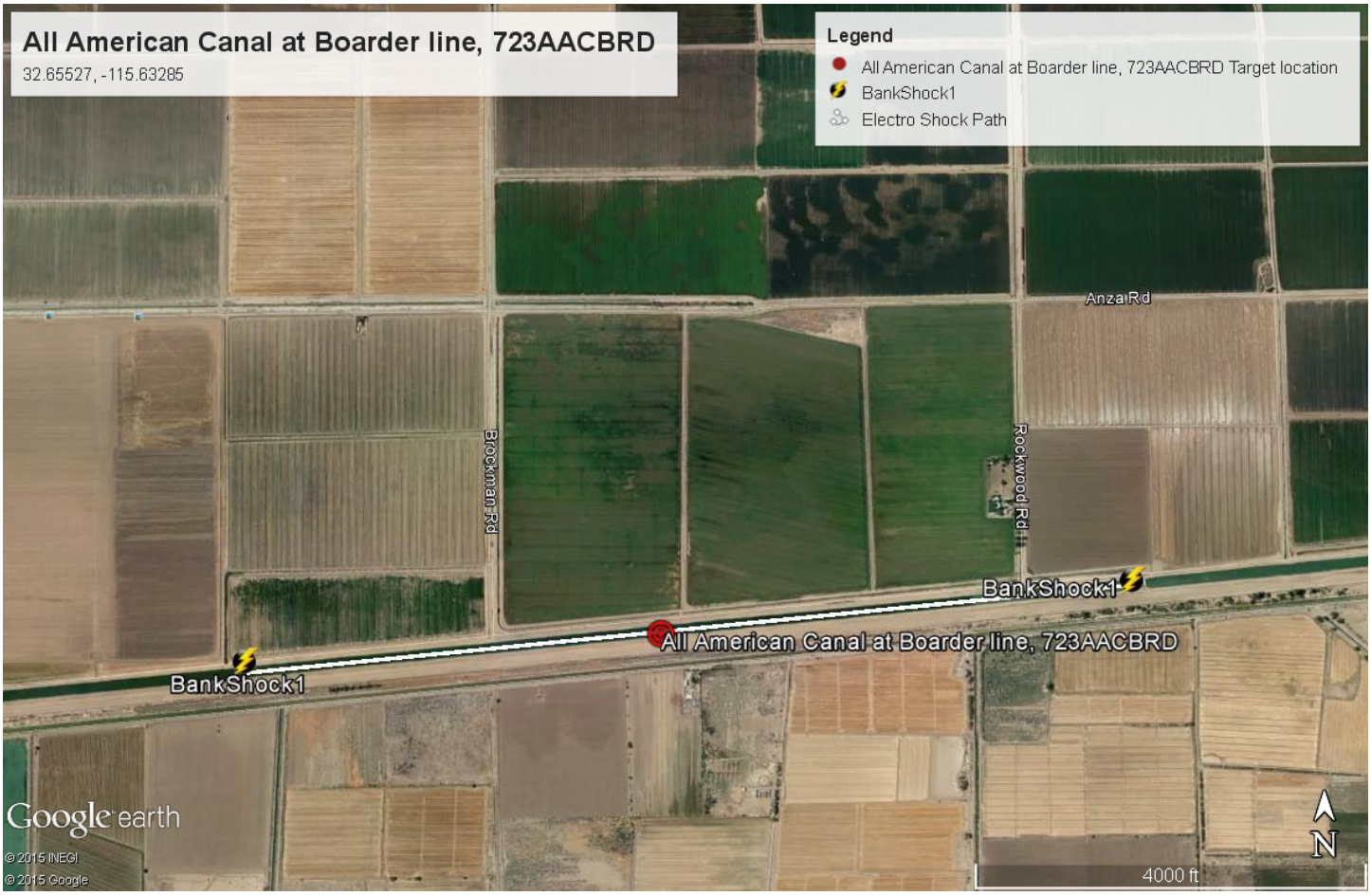

Collection Method: Electro Shocking
Date of Collection: 11/19/2014
Sample Crew: Jeff Geraci, Billy Jakl, Dylan Service

Channel Catfish															
Total Length (mm)	470	489	553	564	573	573	574	580	584	585	590	590	613	620	650

Largemouth Bass											
Total Length (mm)	280	287	293	336	345	345	354	365	370	407	408

Bluegill											
Total Length (mm)	161	176	180	184	188	188	190	195	200	205	207

Flathead Catfish						
Total Length (mm)	450	465	485	491	540	722

Common Carp					
Total Length (mm)	633	656	673	674	724

Comments: Boat was craned into the canal by Imperial Irrigation District. The check dam closed during our sample effort and dropped the water level by several feet.

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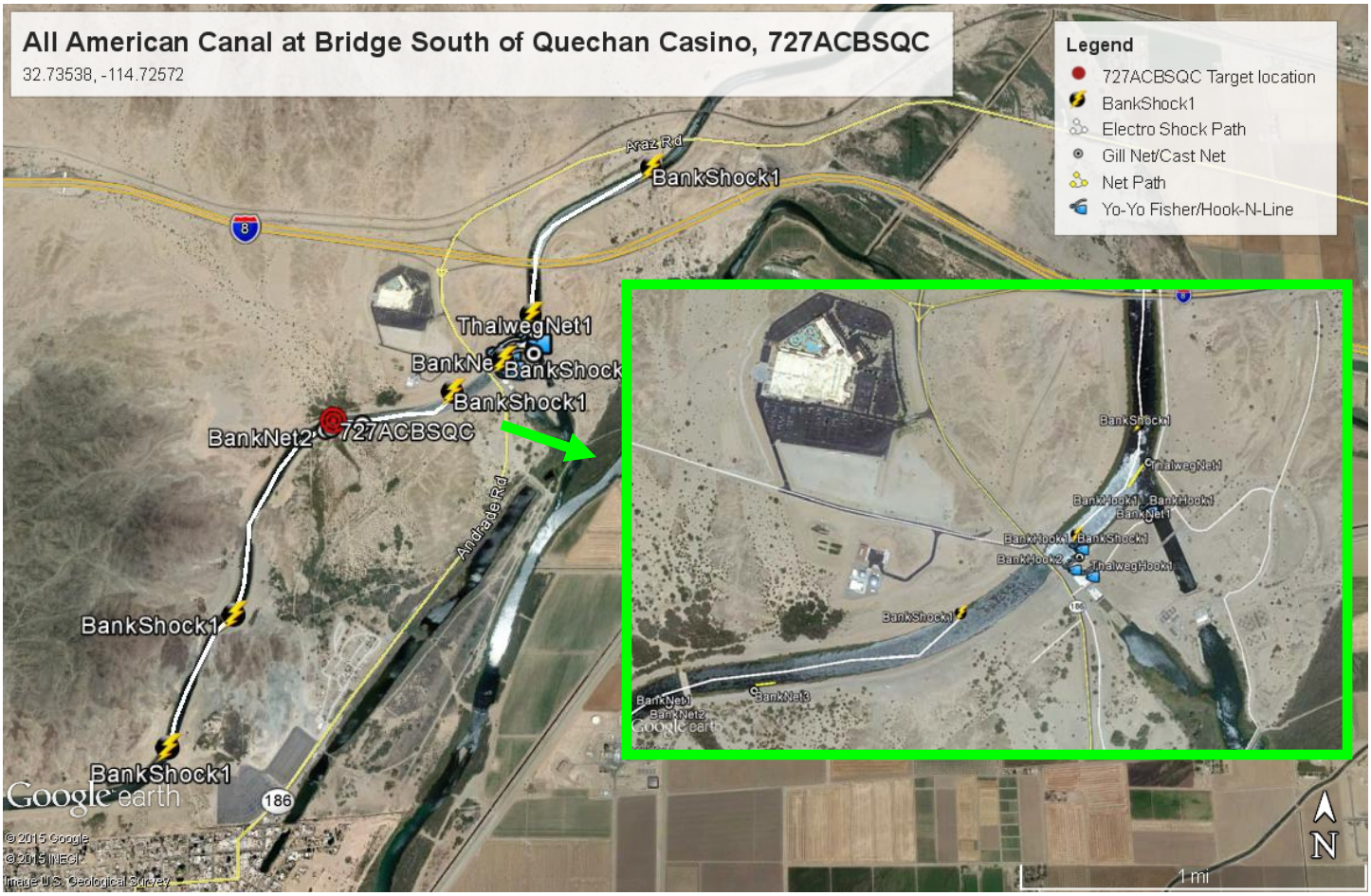

Collection Method: Electro Shocking, Gill Nets, Fyke Nets, Yo Yo Fishers, Hook-N-Line
Date of Collection: 10/28/2014, 11/18/2014
Sample Crew: Billy Jakl, Sean Mundell, Dylan Service, Jeff Geraci

Largemouth Bass															
Total Length (mm)	220	240	248	292	300	330	332	341	344	360	376	391	418	502	647

Common Carp					
Total Length (mm)	610	670	701	714	720

Flathead Catfish			
Total Length (mm)	424	558	560

Redear Sunfish					
Total Length (mm)	282	294	302	304	307

Comments: Boat was craned into the canal by Imperial Irrigation District. Samplers had to travel down stream to find largemouth bass habitat.

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Collection Method: Electro Shocking
Date of Collection: 12/3/2014
Sample Crew: Billy Jakl, Dylan Service

Largemouth Bass													
Total Length (mm)	227	241	257	274	331	334	334	341	363	371	432	434	603

Channel Catfish					
Total Length (mm)	554	561	620	620	648

Flathead Catfish					
Total Length (mm)	583	584	603	691	760

Bluegill					
Total Length (mm)	174	184	191	193	195

Redear Sunfish					
Total Length (mm)	245	248	256	261	262

Common Carp					
Total Length (mm)	486	533	552	561	594

Comments: Boat was launched from the bank at Mesa 2. Most of the largemouth bass were collected on the south side of the canal. Grass carp was the only other fish seen that was not collected for a sample.

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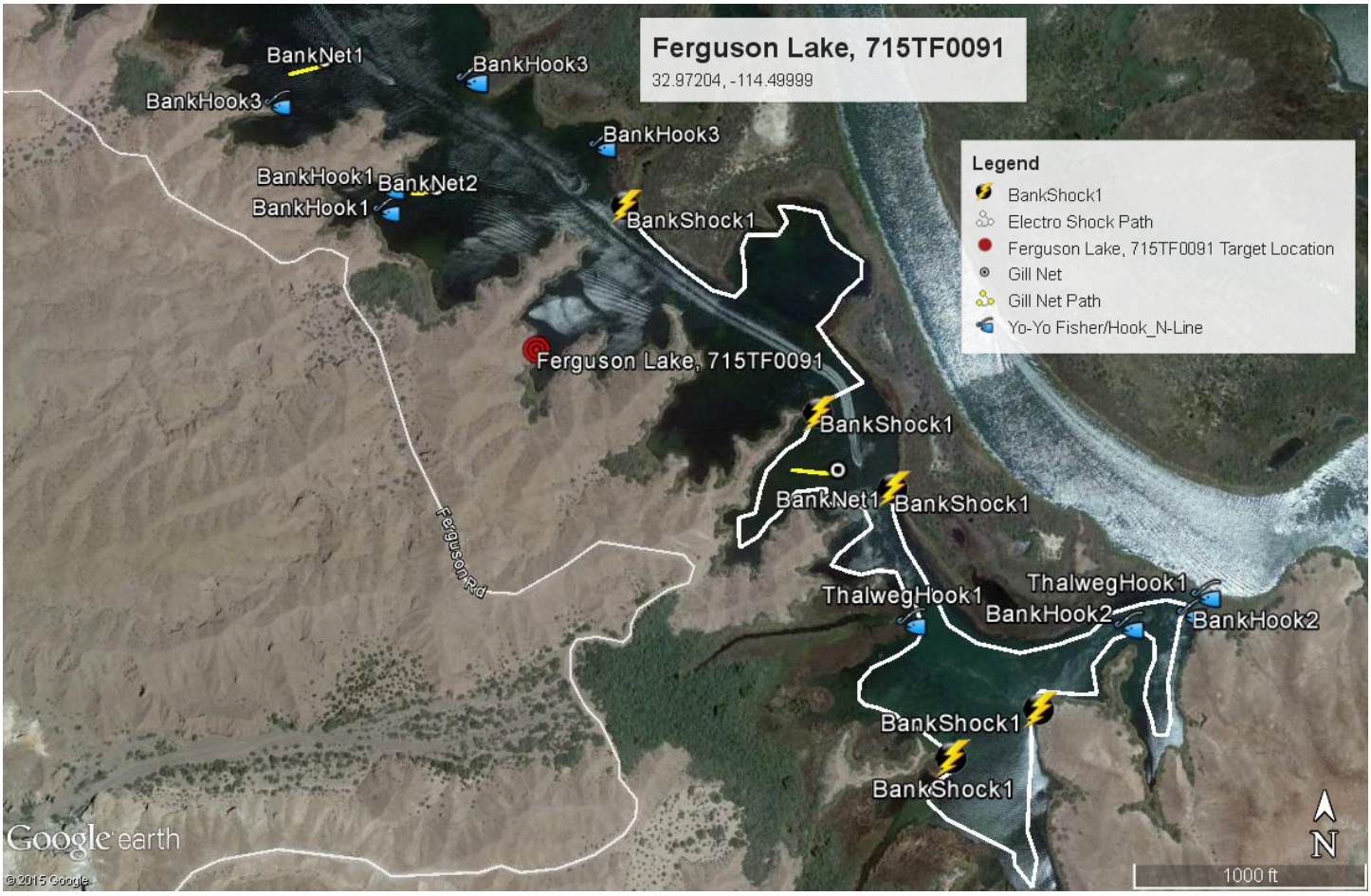

Collection Method: Gill Net, Yo Yo Fishers, Electro Shocking, Hook-N-Line
Date of Collection: 10/7/2014, 10/29/2014, 11/5/2014
Sample Crew: Billy Jakl, Sean Mundell, Gary Ichikawa

Largemouth Bass															
Total Length (mm)	226	260	260	302	310	330	330	331	332	367	393	393	405	410	442

Striped Bass										
Total Length (mm)	305	316	320	325	335	410	420	427	430	473

Black Crappie				**Common Carp**					
Total Length (mm)	324	364		Total Length (mm)	505	505	510	533	590

Channel Catfish								
Total Length (mm)	270	283	355	385	430	443	450	475

Bluegill								
Total Length (mm)	130	138	140	157	162	166	175	193

Redear Sunfish				
Total Length (mm)	196	205	217	225

Comments: Samplers used numerous techniques to collect fish and made multiple trips due to boat troubles.

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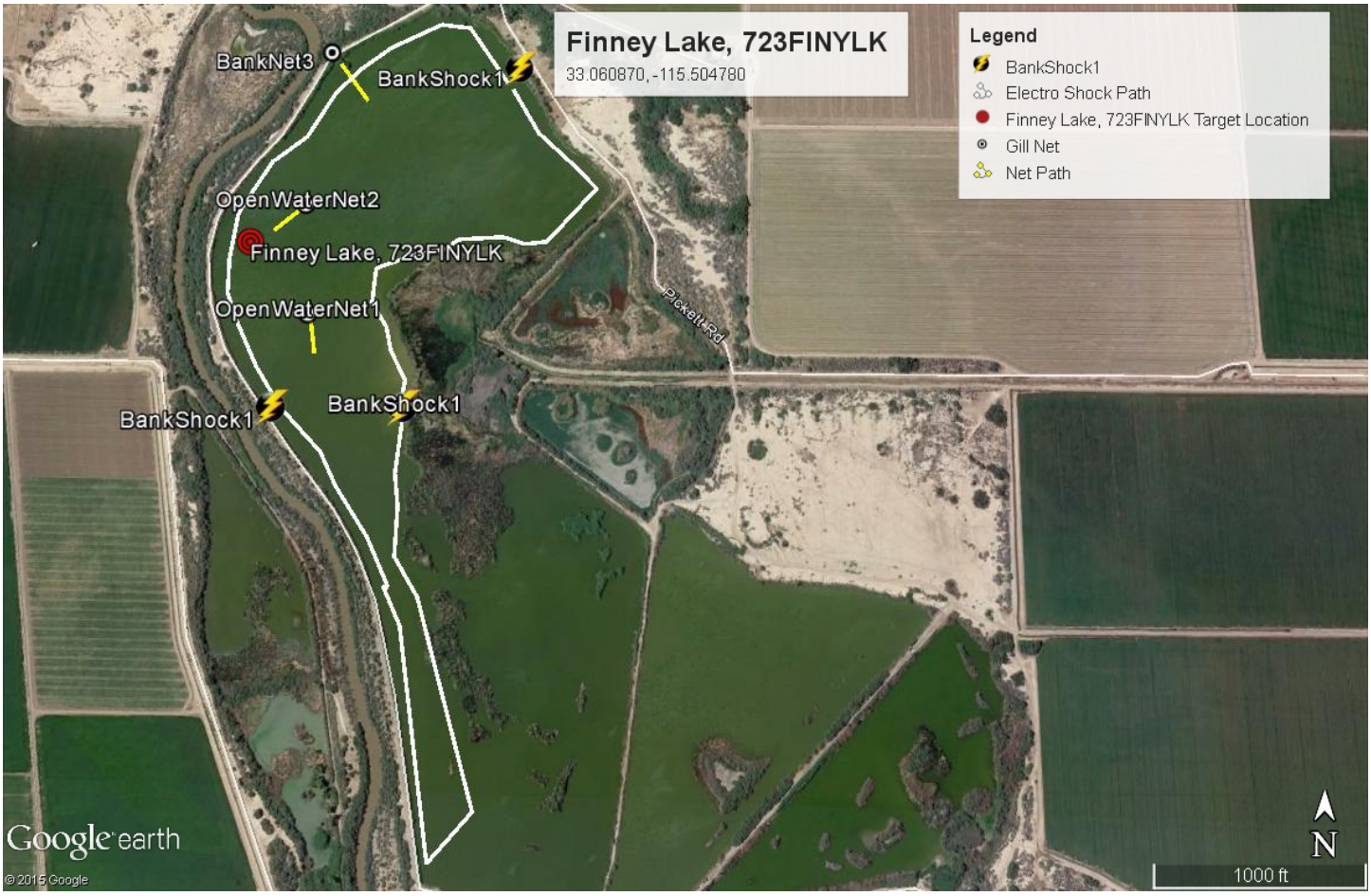

Collection Method: Electro Shocking, Gill Nets, Fyke Nets, Yo Yo Fishers
Date of Collection: 11/18/2014
Sample Crew: John Goetzl, Gary Ichikawa

Common Carp										
Total Length (mm)	288	290	290	319	320	325	328	328	351	358
Black Crappie										
Total Length (mm)	195	204	205	205	208	230				
Largemouth Bass										
Total Length (mm)	260	260	302	302	402	402				
Flathead Catfish										
Total Length (mm)	690									

Comments: The entire lake was less than 1m deep and high salinity made collection very difficult.

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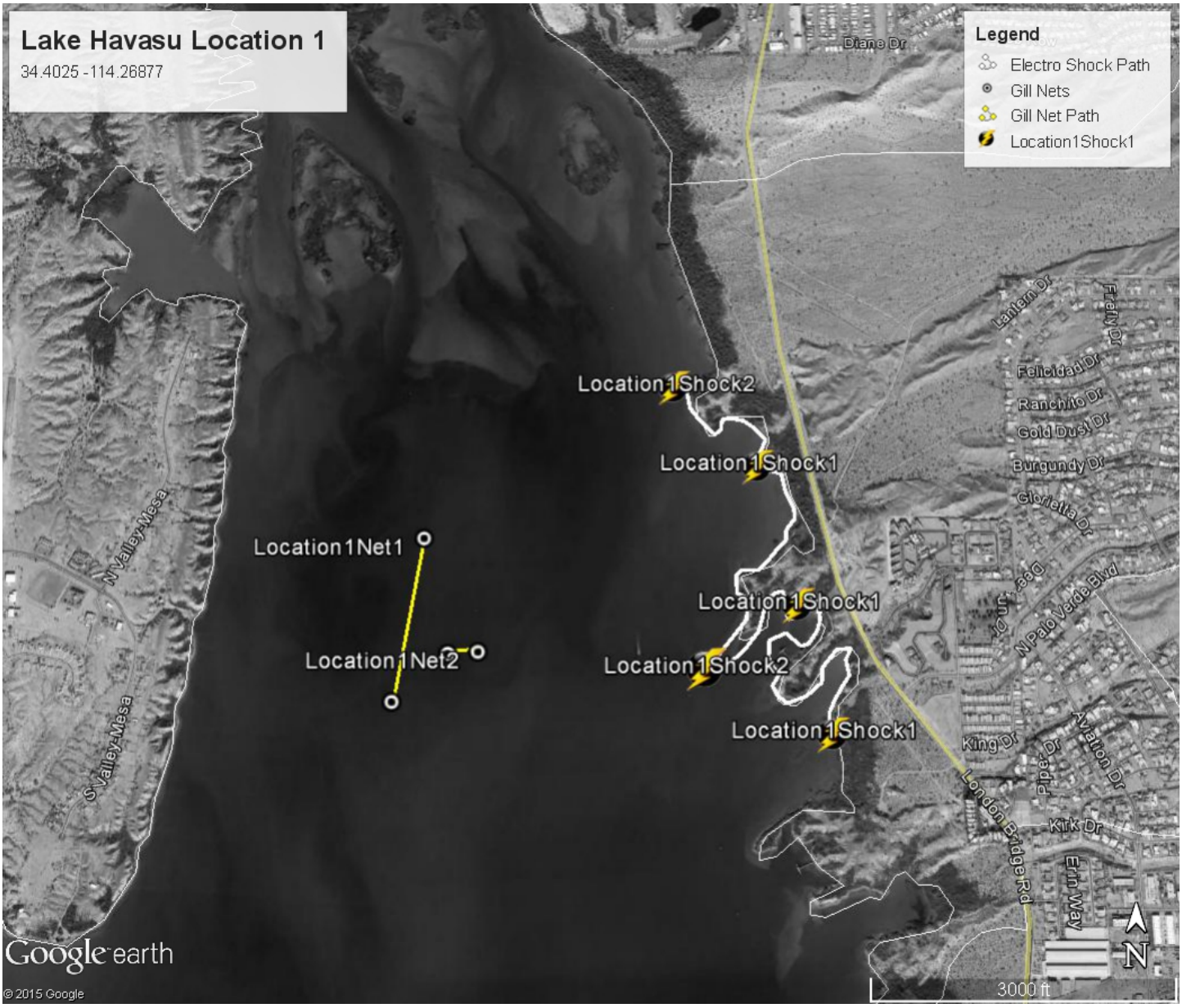

Collection Method: Electro Shocking, Gill Nets
Date of Collection: 11/10, 11/11 2014
Sample Crew: Billy Jakl, Sean Mundell

Largemouth Bass											
Total Length (mm)	246	272	381	401	402	412	466	474	478	489	506

Striped Bass										
Total Length (mm)	464	490	502	529	536	547	573	576	601	609

Bluegill					
Total Length (mm)	126	137	140	143	149

Channel Catfish					
Total Length (mm)	636	656	731	782	786

Redear Sunfish				
Total Length (mm)	172	206	284	314

Comments: Gill nets caught all the striped bass and channel catfish. No other fish species were seen except those collected.

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Collection Method: Electro Shocking, Gill Nets

Date of Collection: 11/11, 11/12 2014

Sample Crew: Billy Jakl, Sean Mundell, Dylan Service, Gary Ichikawa

Largemouth Bass											
Total Length (mm)	270	271	324	389	411	424	446	456	471	490	510
Striped Bass											
Total Length (mm)	417	431	444	474	476	491	504	538	622	634	
Bluegill											
Total Length (mm)	131	132	136	137	139	140	141	142	146	147	
Channel Catfish											
Total Length (mm)	699	743	761	770	836						
Redear Sunfish											
Total Length (mm)	303	304	327	361	382						

Comments: Largemouth bass were very difficult to find in this area of Havasu. Majority of the fish collected were from the gill net sets.

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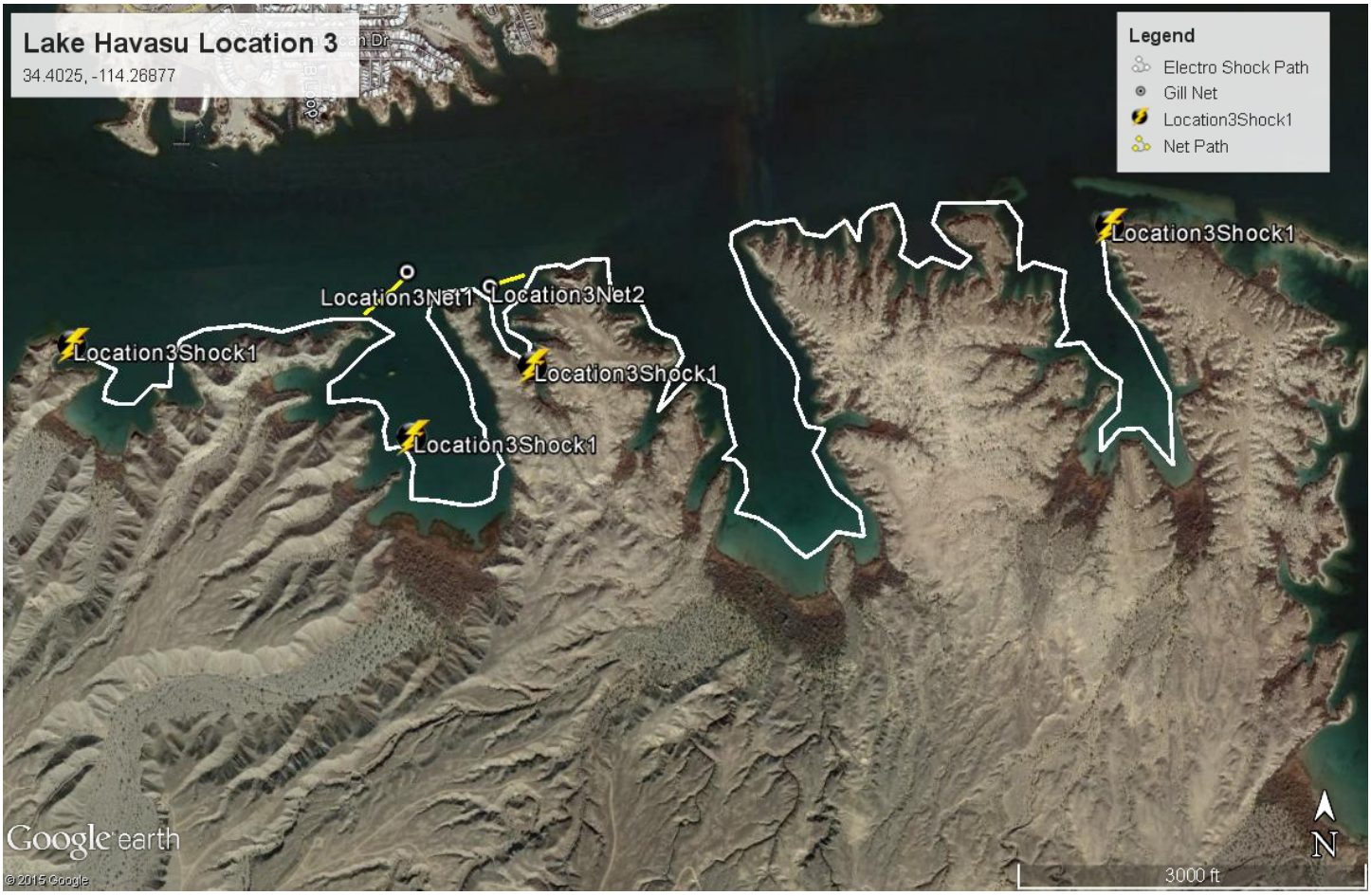

Collection Method: Electro Shocking, Gill Nets
Date of Collection: 11/11, 11/12 2014
Sample Crew: Billy Jakl, Sean Mundell

Largemouth Bass											
Total Length (mm)	226	251	356	373	400	414	420	450	468	474	521
Striped Bass											
Total Length (mm)	500	512	516	542	549	554	629	652	654	656	
Bluegill											
Total Length (mm)	151	152	155	168	180						
Channel Catfish											
Total Length (mm)	619	641	661	704	752						
Redear Sunfish											
Total Length (mm)	196	202	208	249	320						

Comments: Largemouth bass were very spread out. Samplers had to cover a large amount of shoreline to complete the sample.

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Collection Method: Electro Shocking, Gill Nets
Date of Collection: 11/11, 2014
Sample Crew: Dylan Service, Gary Ichikawa

Largemouth Bass											
Total Length (mm)	309	327	340	340	344	373	399	409	415	415	448
Striped Bass											
Total Length (mm)	394	416	422	422	434	439	444	484	500	507	
Tilapia spp.											
Total Length (mm)	161	181	192	212	212						
Channel Catfish											
Total Length (mm)	649	654	674	741	780						
Redear Sunfish											
Total Length (mm)	131	140	145	146	148	154	157	162	166	171	

Comments: No bluegills were seen at this location. A considerable effort was given to try and find bluegill.

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Collection Method: Cast Nets
Date of Collection: 12/8/2014
Sample Crew: Billy Jakl, Dylan Service

Common Carp					
Total Length (mm)	298	354	411		
Tilapia spp.					
Total Length (mm)	305	311	326	331	334
Largemouth Bass					
Total Length (mm)	212	273	286		

Comments: High conductivity and low flows made collection impossible with the Eboat. Samplers walked along the banks of the new river using cast nets to collect target species. Several nets were destroyed on debris in the river.

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Collection Method: Cast Nets
Date of Collection: 11/19/2014
Sample Crew: Billy Jakl, Dylan Service, Jeff Geraci

Common Carp									
Total Length (mm)	439	484	484	495	553	574	610		
Tilapia spp.									
Total Length (mm)	299	299	310	335	335	341	349	362	390

Comments: High conductivity and low flows made collection impossible with the Eboat. Samplers crept up to the sewage treatment plant discharge and threw cast nets into the confluence to collect target species.

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Collection Method: Cast Nets, Yo Yo Fishers/Hook-N-Line
Date of Collection: 12/1, 12/2, 12/10/2014
Sample Crew: Billy Jakl, Dylan Service

Common Carp		
Total Length (mm)	432	561

Tilapia spp.					
Total Length (mm)	224	231	232	252	260

Comments: High conductivity and low flows made collection impossible with the Eboat. Samplers used every other method possible to collect the target species.

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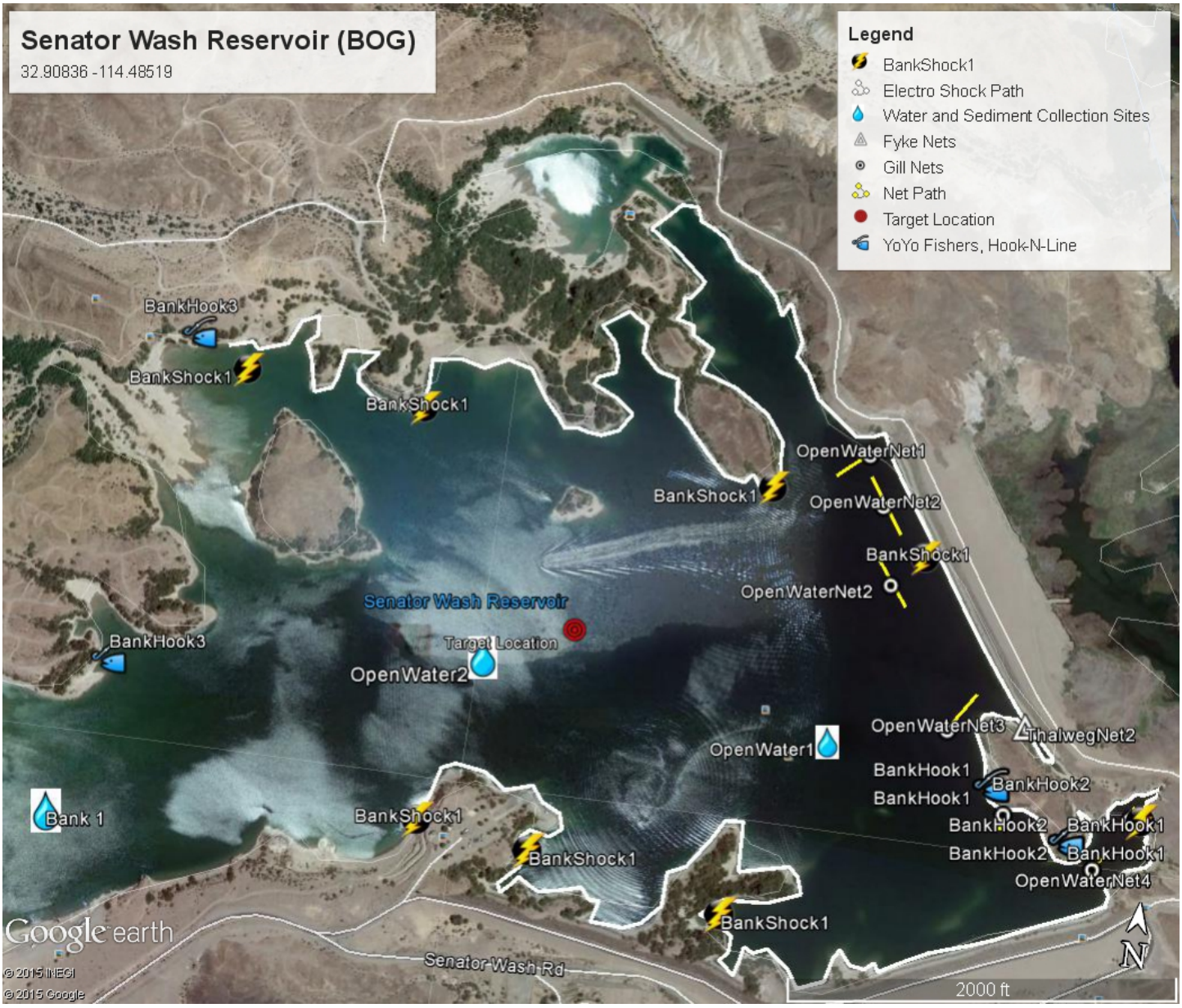

Collection Method: Electro Shocking, Gill Nets, Fyke Nets, Yo Yo Fishers, Hook-N-Line
Date of Collection: 11/18/2014
Sample Crew: Billy Jakl, Sean Mundell, Gary Ichikawa

Bluegill															
Total Length (mm)	123	132	136	142	142	143	144	150	150	155	156	160	160	166	180
Largemouth Bass															
Total Length (mm)	218	225	246	267	270	330	350	355	365	382	435	465			
Striped Bass															
Total Length (mm)	315	325	327	335	335	336	340	350	354	354	363	365	365	380	420
Channel Catfish															
Total Length (mm)	235	250	270	270	270	310	350	360	365	370					
Common Carp															
Total Length (mm)	600	605	610	650	660										

Bluegill (Prey Species)										
Total Length (mm)	75	76	76	78	80	80	84	85	87	89
Largemouth Bass (Prey Species)										
Total Length (mm)	90	90	90	90	98	99	100	100	100	100

Comments: This lake was apart of the BOG clean lakes study. Prey fish were collected as well as water and sediment in addition to the sport fish. The water level in the reservoir dropped 10-15 ft over the dates sampled which reduced the amount of fish habitat. This made largemouth bass collection very difficult. Multiple days were spent looking for largemouth bass.

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Collection Method: Gill Nets, Yo Yo Fishers, Electro Shocking
Date(s) of Collection: 10/7/2014, 10/22/2014, 10/28/2014, 11/4/2014
Sample Crew: Billy Jakl, Sean Mundell, Gary Ichikawa

Largemouth Bass														
Total Length (mm)	207	221	240	285	335	345	346	370	371	383	399	440	457	483

Striped Bass											**Black Crappie**	
Total Length (mm)	391	400	403	410	415	418	421	464	464	555	Total Length (mm)	365

Bluegill								**Redear Sunfish**					
Total Length (mm)	158	175	187	188	190	202	204	Total Length (mm)	236	236	250	260	285

Flathead Catfish							**Common Carp**					
Total Length (mm)	430	454	510	520	620	635	Total Length (mm)	567	570	575	575	603

Channel Catfish			**Tilapia spp.**		
Total Length (mm)	383	490	Total Length (mm)	375	385

Comments: Samplers caught 50+ American Gizzard Shad in each gill net set, which attracted catfish to the net.

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Collection Method: Electro Shocking, Gill Nets
Date of Collection: 9/30, 10/20, 10/28/2014
Sample Crew: Billy Jakl, Sean Mundell, Gary Ichikawa, Dylan Service

Largemouth Bass												
Total Length (mm)	235	242	262	290	310	310	335	341	349	361	408	475

Common Carp							
Total Length (mm)	390	410	535	625	637	680	686

Flathead Catfish						
Total Length (mm)	205	247	270	449	710	930

Channel Catfish				
Total Length (mm)	435	493	555	580

Redear Sunfish										
Total Length (mm)	110	114	119	126	129	130	145	149	164	175

Bluegill (Prey Species)										
Total Length (mm)	68	79	79	80	83	87	87	89	94	95
Largemouth Bass (Prey Species)										
Total Length (mm)	61	62	64	67	68	76	76	79	84	100
Threadfin Shad (Prey Species)										
Total Length (mm)	72	72	79	81	81	84	86	87	89	89

Comments: This lake was apart of the BOG clean lakes study. Prey fish were collected as well as water and sediment in addition to the sport fish. Boat troubles forced samplers to make several attempts over the month of October.

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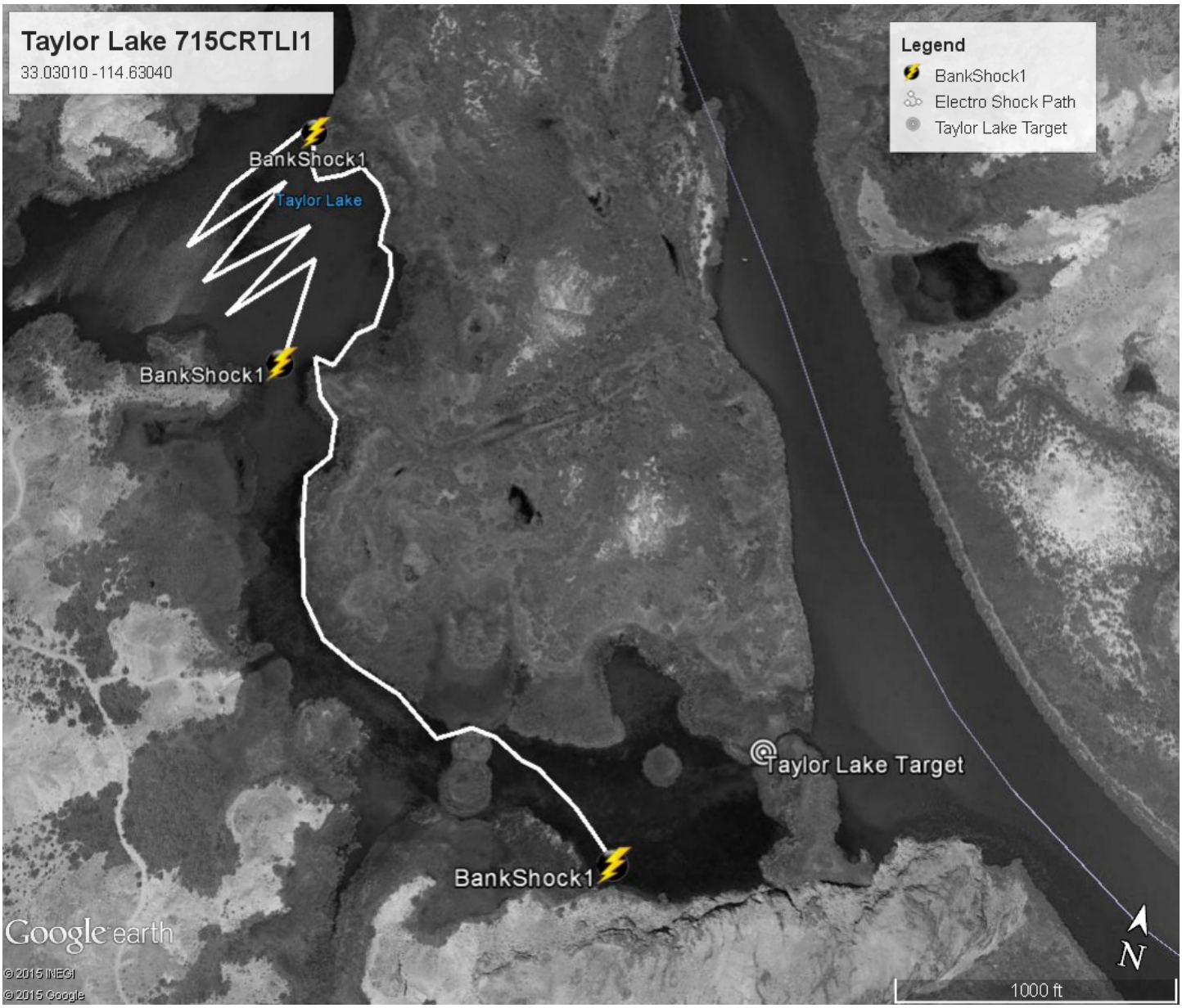

Collection Method: Electro Shocking
Date of Collection: 11/4/2014
Sample Crew: Billy Jakl, Gary Ichikawa

Largemouth Bass													
Total Length (mm)	205	230	282	283	330	333	335	364	365	385	400	425	431
Redear Sunfish													
Total Length (mm)	150	165	166	174	200	210	225	254	276	280			
Brown Bullhead													
Total Length (mm)	245	280	290	295	305	310							
Common Carp													
Total Length (mm)	520	536	540	545	573								
Bluegill													
Total Length (mm)	126	129	131	140	153								

Comments: Entire Lake was less than 1m deep, so we could not deploy gill nets. Also, the vegetation was closing off sections of the lake. Some narrow channels were the only thing connecting the open water.

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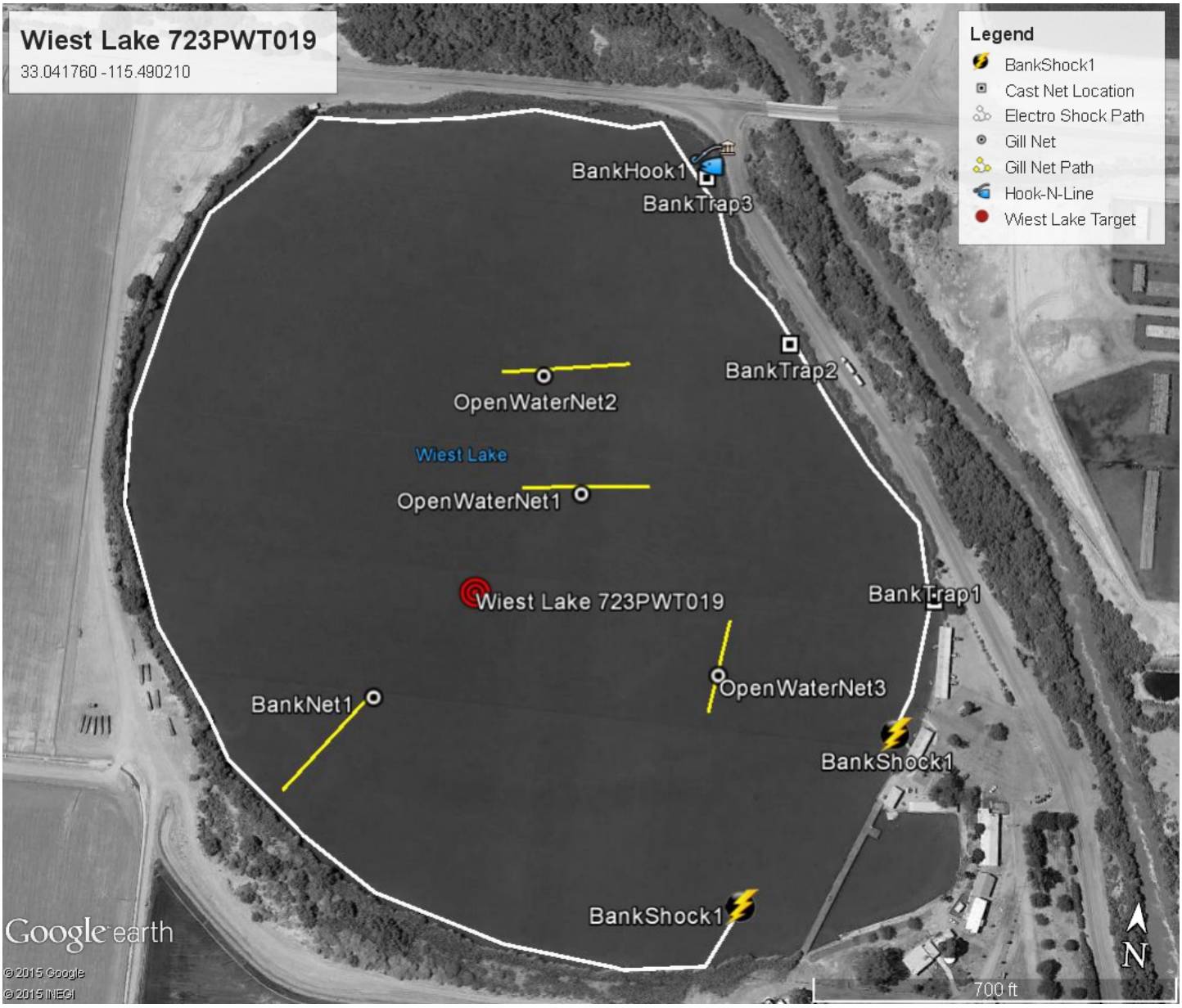

Collection Method: Electro Shocking, Gill Nets, Fyke Nets, Yo Yo Fishers
Date of Collection: 11/18/2014
Sample Crew: Dylan Service, John Goetzl, Gary Ichikawa, Jeff Geraci

Largemouth Bass																		
Total Length (mm)	234	235	236	241	254	285	285	303	308	332	340	362	362	399	444	451	468	536

Channel Catfish													
Total Length (mm)	237	281	282	308	321	324	336	352	376	397	501	512	630

Black Crappie									
Total Length (mm)	261	264	270	270	271	272	284	322	332

Redear Sunfish			
Total Length (mm)	141	176	184

Striped Bass			
Total Length (mm)	200	339	406

Comments: Boat trouble and high salinity made fish collection difficult and required multiple trips.

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