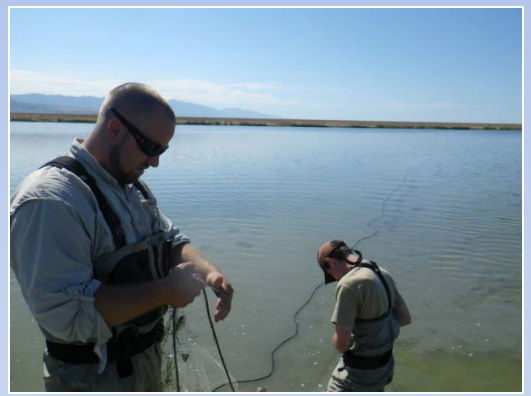
Willard Spur Fishery Investigation


Chris Penne
Regional Aquatic Biologist
Utah Division of Wildlife Resources

October 23, 2012

UTAH DNR WILDLIFE RESOURCES

Objectives

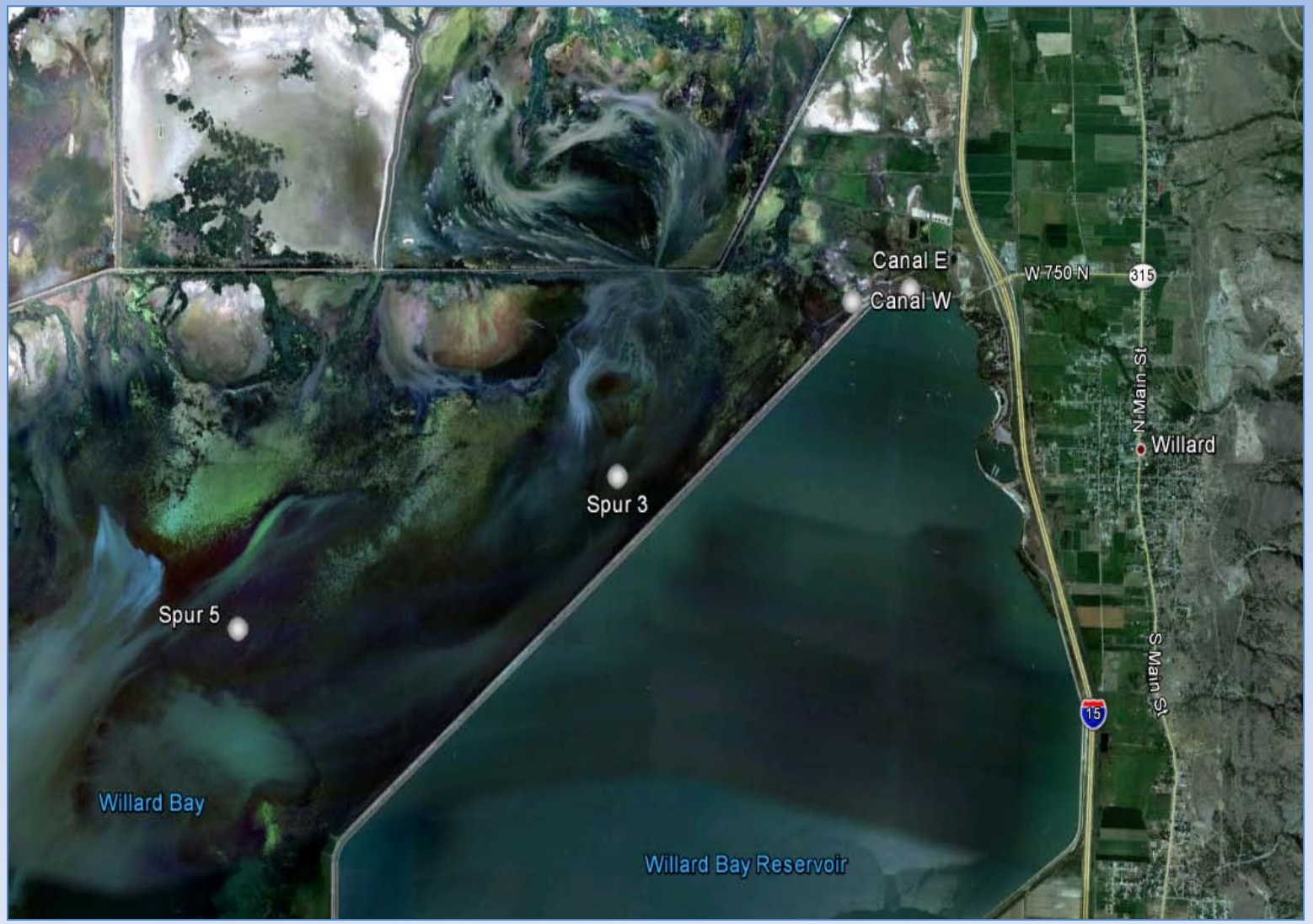
Characterize these aspects of the fishery:

1) Fish community composition
2) Use of the Spur by fish
   - Food
   - Spawning
   - Role of fish
   - Environmental influences

Methods

- Sampled the fishery in August using gill nets and minnow traps
  - Nets and traps deployed at four locations
  - Sampling gear allowed to fish overnight
  - Efforts made to sample same sites as those used in 2011 investigation

Methods


Canal E
Canal W
W 750 N
315
N Main St
Willard
Spur 3
Spur 5
S Main St
15
Willard Bay
Willard Bay Reservoir

Methods

Conducted literature review to determine use of Willard Spur by fish

Sources searched:

- Utah DNR library
- Utah State University library
- Bear River Migratory Bird Refuge library
- Internet

Field Survey Results

Species Sampled:

Field Survey Results

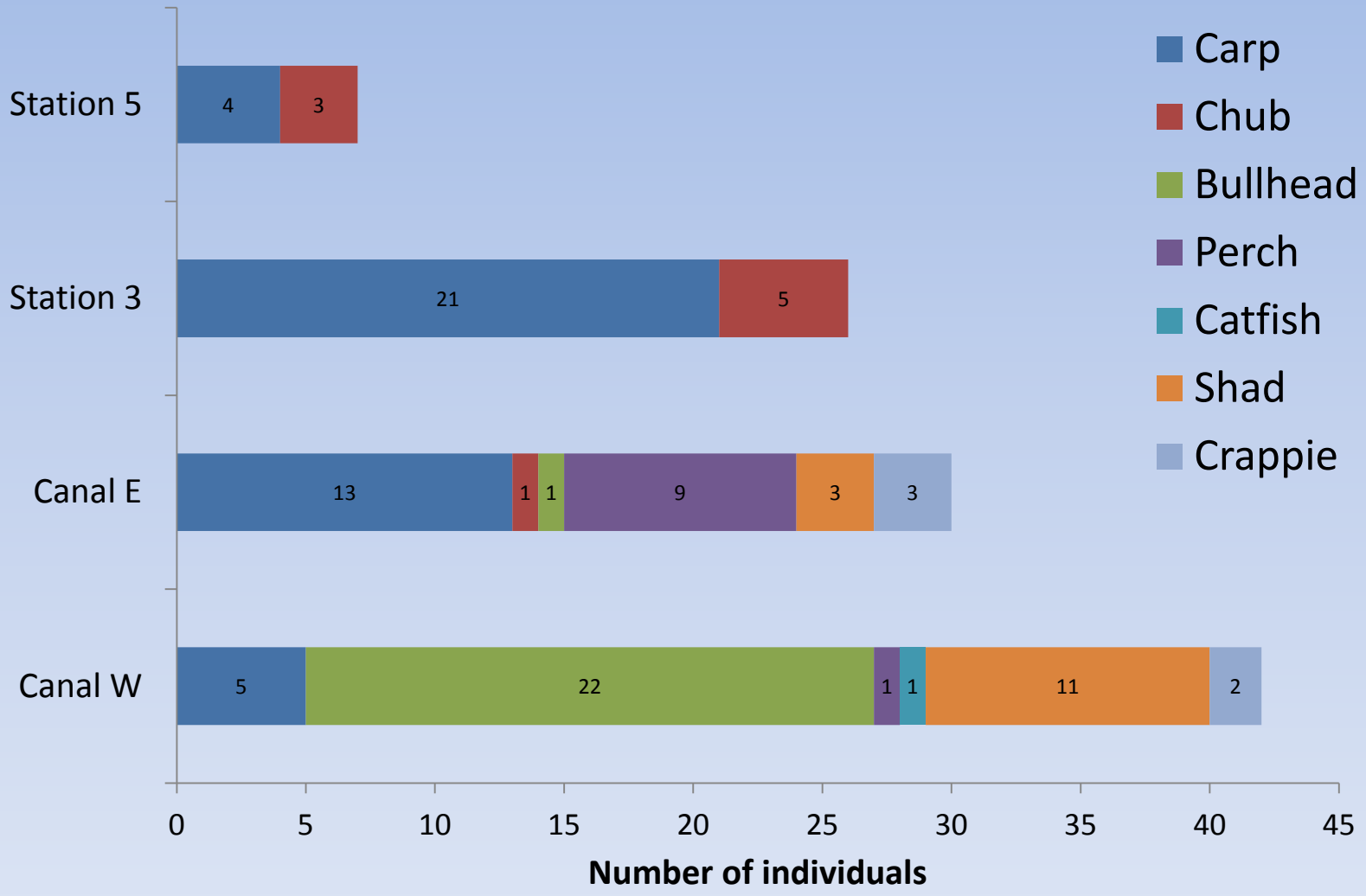


Figure 1.—Species composition and numbers surveyed in the Willard Spur by site

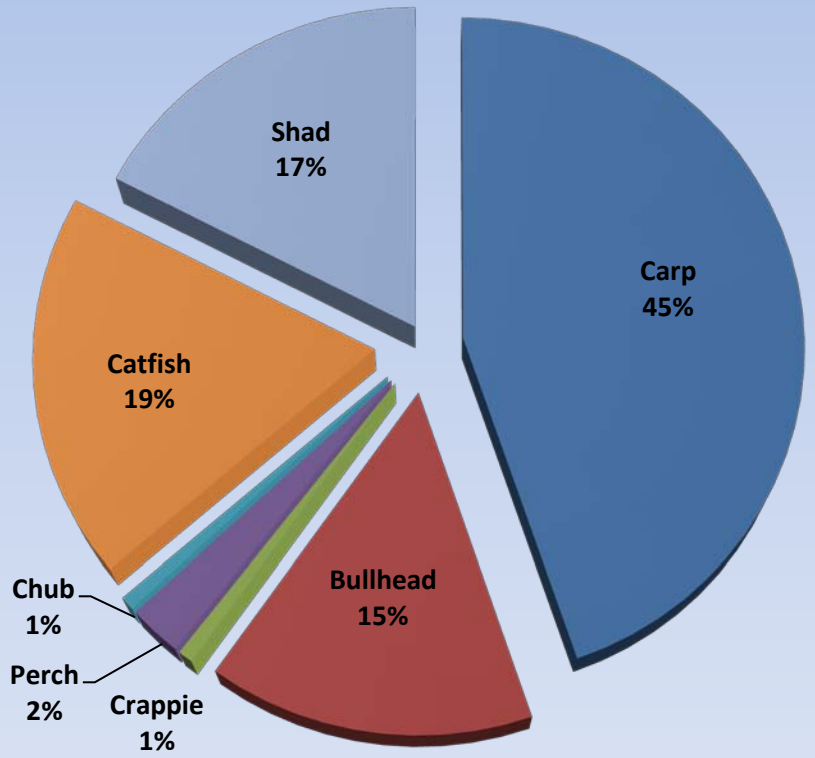
Field Survey Results

Table 1. Species composition, length structure, and estimated weight of sampled.

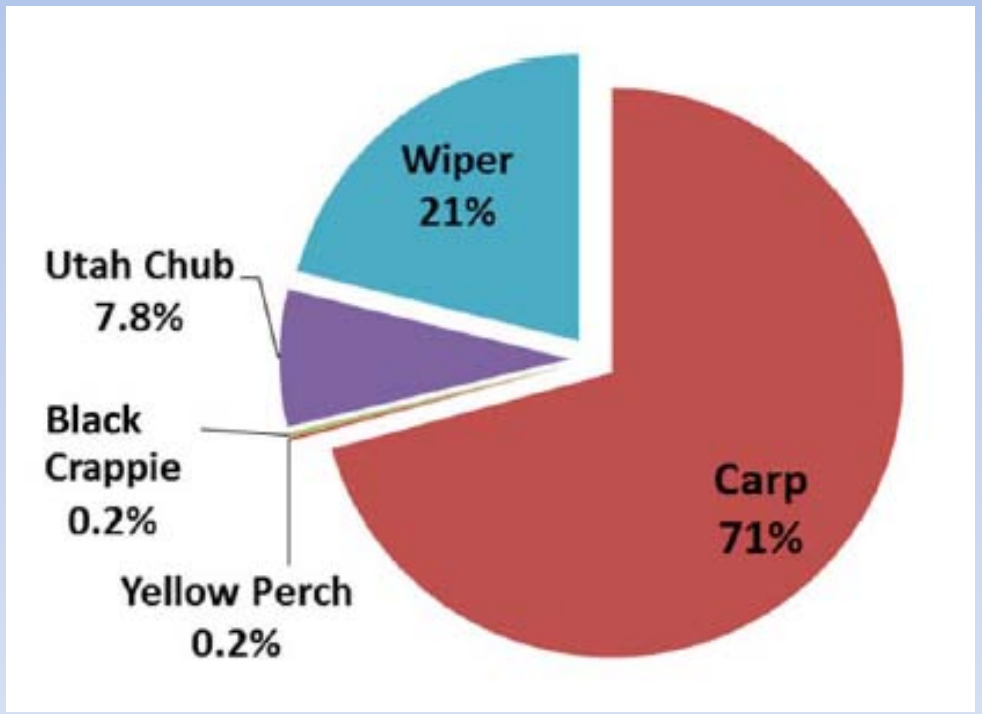
Species	Catch	Length range (mm)	Mean length (mm)	Mean length (SE)	Est. mean weight (g)
Common carp	43	70 - 326	138.1	10.7	74
Utah chub	9	80 -250	129.7	8.3	5
Black bullhead	23	97 -155	110.3	5.5	47
Black crappie	5	85 - 265	172.6	21.7	10
Yellow perch	12	25 -110	65.3	12.0	18
Gizzard Shad	14	86 - 109	94.4	3.9	89
Channel catfish	1	514	514	-	1349

Field Survey Results

Estimated Fish Biomass 2012



Estimated Fish Biomass 2011



Literature Review Results

- No reported fishery surveys prior to Moore 2011.
- Field surveys confirmed observation by bird biologists and anglers that the fishery is comprised predominately of carp

Fish Reproduction in the Spur

Spawning requirements met:

- Common carp – shallow veg. areas
- Black bullhead – shallow veg. areas
- Utah chub – shallow veg. areas
- Yellow perch – shallow veg. areas
- Black crappie – shallow veg. areas
- Gizzard shad – sand, rock, or debris

Fish Reproduction in the Spur

Spawning requirements not met:

- Channel catfish – prefer cavities
- Wiper – effectively sterile

Food Items

- Dominant species in the Spur include common carp, and a mix of Utah chub, gizzard shad, and black bullhead.
- All dominant fish feed have a flexible diet including: plankton, macroinvertebrates, plant material, and detritus.




Role of Fish in Willard Spur

- The Spur fishery experiences low recreational use by anglers
  - Limited access
  - Carp are not highly sought sport fish in America

- Fish in the Spur play an important role as a dietary item for migratory birds such as the American white pelican.

- When present in large numbers, common carp may have a negative impact on water quality.

Environmental Influences

- Size and quality of fish habitat in the Spur is heavily dependent upon annual precipitation
  - vast expanses of habitat during wet years
  - has been known to dry up completely during times of drought causing complete loss of fishery
    - 3 drought induced fishery losses since 2000
    - 2000, 2001, and 2007
- Seasonal distributions of fish in the Spur likely follow typical patterns of fish

Summary & Discussion

- The most abundant fish in the Spur are ecological generalists, capable of surviving a variety of habitats
- Common carp, black bullhead, and even Utah chub have broad temperature and dissolved oxygen tolerance

Species	Minimum D.O. (mg/L)	Upper Thermal Limit
Common Carp	2.0	101° F
Black Bullhead	1.1	101° F
Rainbow Trout	5.0	80° F

Summary and Discussion

- Q: Are further fishery surveys warranted?
- *A: Depends what information is desired.*

- Q: How do you find out what fish are feeding on?
- *A: Conduct a diet study. Must consider:*
  - *Time of day*
  - *Location*
  - *Prey availability*
  - *Sampling gear*
  - *Whole stomach vs. gastric lavage*

Questions

- Are enough additional nutrients entering the Spur in treated effluent to:
  - encourage blooms of toxin-producing cyanobacteria?
  - significantly increase biochemical oxygen demand and decrease D.O. to lethal levels for fish?