



# Comprehensive Aquatic Database

## SOUTH DAKOTA GAME, FISH and PARKS

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# Lifecycle of Data







# Where We Wanted To Go



- Collection
- Storage
- Analysis
- Dissemination







*Start*

RFP #2 – 2014  
System Build

2010 – Data  
Management  
Meeting

2015 – ESRI  
Contract  
Begins

2013 –  
Needs  
Assessment

RADHA  
Project





# Needs of the System

## 1. Import Historical Data

- CREEL Files
- WINFIN Files

## 2. Create new centralized system for Data Entry

- Custom ESRI Applications
  - Lake Survey and Bus Routes
- Survey123 for other surveys

## 3. Automate the creation of Creel and Lake Survey Reports

## 4. Download Page

- Staff can interact with data for further analysis

## 5. Public Interface

- Web Map and Access to final reports



# Mapping out the data workflow



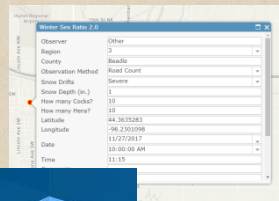
Data Collection



Current Campaign Data



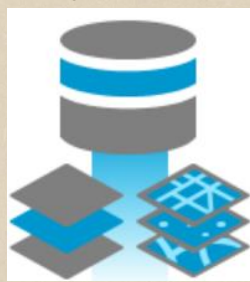
Editing Tools



2017\*

Current Campaign Survey Copy (SDE)

Copied Daily  
(AGO overwrites SQL Server)



2017\*

Data Archive (SDE)



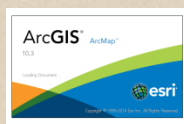
2017\*  
2016  
2015  
2014  
2013....

Moved Annually

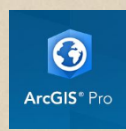
Viewing Tools



SSRS Reports



ArcGIS Desktop



Processed and Re-published to ArcGIS Online





# 1. Import Historical Fisheries Data

- Lake Survey Data (WINFIN Files)
  - **2,400** Files located by searching 6 local office N-drives
  - Oldest file from **1983**
  - **33,000** lake survey stations
  - **800,000** lengths
  - **2.1 million** counted fish
- Creel Survey Data (CAS FILES)
  - **100,000+** Interviews
- Stocking Records
  - **50,000** records dating back to the 1900s

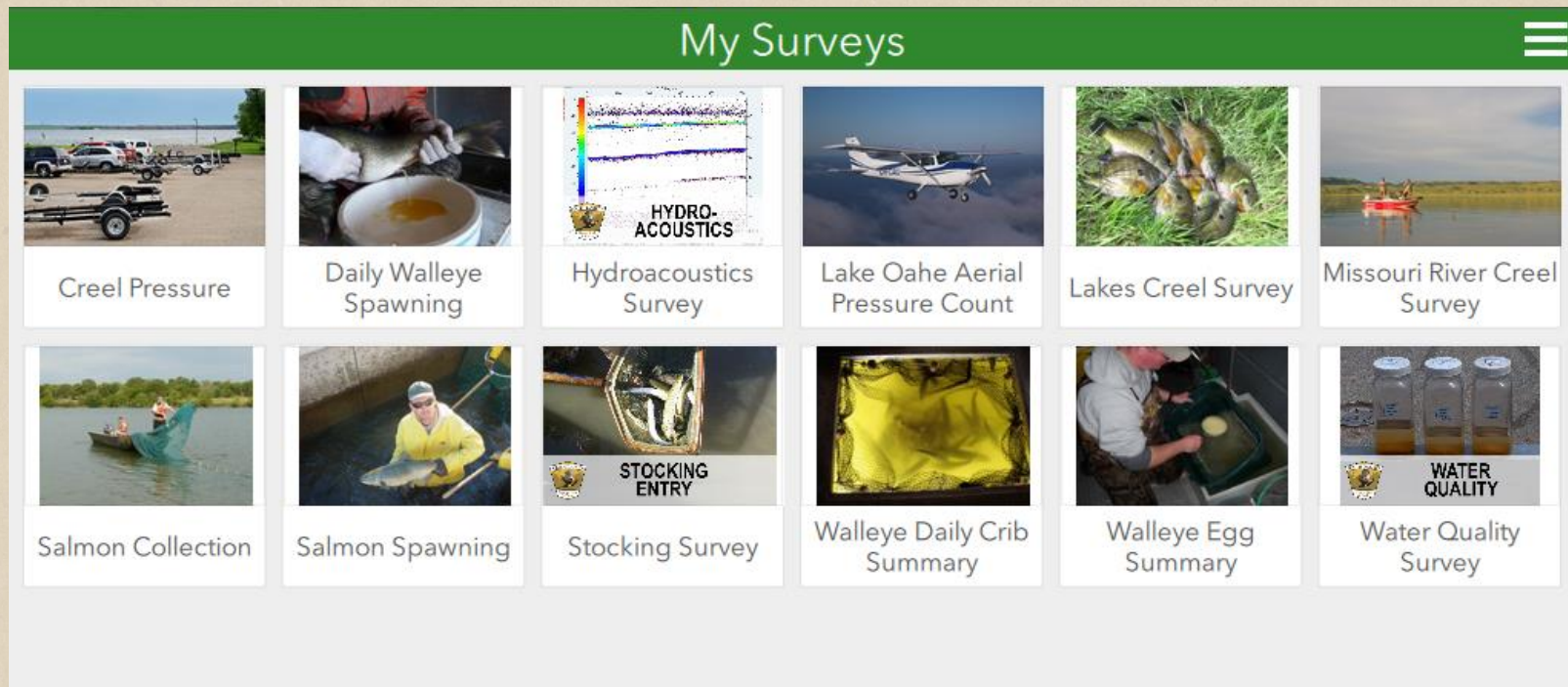
***Biggest task was to assign all this data to the current lake!***



## 2. Centralized system for Data Entry



- Mobile Data Collection or Desktop Application
- Currently over **30** tablets distributed across Fish Management Areas



# 2. Custom Data Entry Applications



- Lake Survey

- Creel Pressure

LakeSurvey

SurveyID	County	Waterbody	Survey Date	Method	Station	Effort	Submitted
1	Buffalo	Francis Case		GillNet			1
2	Buffalo	Oahe	Monday, February 27, ...	Electrofishing	11	1 hour	0
3	Buffalo	Oahe	Monday, February 27, ...	Electrofishing	11	1 hour	0
4	Buffalo	Oahe	Monday, February 27, ...	Electrofishing	11	1 hour	0
5	Buffalo	Oahe	Monday, February 27, ...	Electrofishing	113	1 hour	1

County:  Waterbody:  Survey Date:  Method:  Station:  Effort:

Creel Pressure

SurveyID	Waterbody	County	Survey Date	Access Area Name	Arrival Time	Departure Time	Submitted
3	Francis Case	Stanley	Wednesday, May 3, 2...	Area 1	10	14	1

Waterbody:  County:  Survey Date:  Access Area Name:  Arrival Time:  Departure Time:

LakeSurvey

View/Edit Observations

ID	County	Waterbody	Survey Date	Method	Station	Effort
3	Buffalo	Oahe	y, February 27, 2017	Electrofishing	11	1 hour

ID	Species	Length	Weight	Structure	Serial	Tag Number	Tag Color	Submitted
2	Walleye	100	10	Annulus	12345	123456789	Red	0
3	Chinook	100	10	Annulus	12345g	123456789g	Red	0

Species:

Length(mm):

Weight(lb oz):

Structure:

Serial Number:

Tag Number:

Tag Color:

Creel Pressure

ID	Waterbody	County	Survey Date	Access Area Name	Arrival Time	Departure Time
3	Francis Case	Stanley	wesday, May 3, 2017		10	14

ID	Angler or Ve...	FishingMethod	Units in Count	Party Arrival ...	Party Depart...	Submitted
1	efsefe	Angler Shore		15:19	15:19	0
2	efsefe	Angler Shore		7:56	7:56	0
3	efsefe1	Angler Shore		7:56	7:56	0

Angler or Party Identifier:

Fishing Method:

Units in Count:

Party Arrival Time:

Party Departure Time:

*Because not everything fits into a box!*





# 3. Automate the Final Report

http://2014.ssrs.sd.gov/Reports/Pages/Report.aspx?ItemPa...

SSRS HOME Web Slice Gallery

Home > GFP > Fisheries > Prod > CreelSurvey

Lake Name: Francis Case (Brule) Species List:

Year:

- ☐ (Select All)
- ☐ Bigmouth Buffalo
- ☐ Black Bullhead
- ☐ Black Crappie
- ☐ Bluegill
- ☐ Bluegill Green Sunfish Hybrid

http://2014.ssrs.sd.gov/Reports/Pages/Report.aspx?ItemPa...

SSRS HOME Web Slice Gallery

Home > GFP > Fisheries > Prod > FisheriesSurvey

Lake Name: Cochrane (Deuel) Year: 2016

Species List: Walleye

1 of 2 ? 100% Find | Next

Species: Walleye

Year	N	Mean Length (expanded sample number)						10+ (670)
		1	2	3	4	5	6	
2016	66	6 (213)	8 (314)	43 (423)	4 (505)		2 (518)	
2014	54		18 (356)		24 (404)	6 (421)	6 (472)	
2012	60		6 (244)		24 (388)			30 (327)
2010	177		61 (274)			98 (406)		18 (526)
2008	121			84 (283)	7 (303)	6 (256)	18 (443)	6 (400)

- XML file with report data
- CSV (comma delimited)
- PDF
- MHTML (web archive)
- Excel
- TIFF file
- Word

# 4. Internal Data Access



Home > GFP > Fisheries > Prod > FisheriesSurvey

Year: 2017 Lake Name: Vermilion East (McCook)

Species List: Black Crappie, Northern Pike, W

1 of 2 ? 100% Find | Next

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
Vermilion East, McCook County  
VER-Lake-62-800  
2017

## Lake Information

Name: Verm  
County: McC  
Legal Description: T102  
26-27  
Surface Area: 579.9

## Surveys and Investiga

### Gear

AFS std frame net  
AFS std gill net

SSRS HOME

Home > GFP > Fisheries > Prod > DataDownloadDirectory

1 of 1 100% Find | Next

**Data Download Directory**

Survey	Category	Table Name
Creel	Catch	Daily Catch Final (DC_Cat_Final)
		Strata Catch Final (SC_Cat_Final)
		Total Catch Final By Month (TC_Cat_Final_byMonth)
		Total Catch Overall Covariance (TC_Cat_OA_Cov)
		Total Catch Overall Final (TC_Cat_OA_Final)

Home | My Subscriptions | Help

byMonth)  
OverAll)

Home > GFP > Fisheries > Prod > DataDownloadReports > Lake Survey

Year: 2018 Waterbody Name Contains (optional): bitter

County Name Contains (Optional): Method Name Contains (Optional):

1 of 1 Find | Next

**Lake Survey Raw Data**

**Survey Description**

Survey Date	State ID	Waterbody	WinFinCode	WDN	County	Zone	Station	Method Code	Method	Effort	Survey ID
8/28/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		1	550	AFS std gill net	1	3db90989-dd46-4009-83ce-e0213f889e57
8/28/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		2	550	AFS std gill net	1	a6431a1d-dc21-4c18-9006-dcd50693ed60
8/28/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		3	550	AFS std gill net	1	56a6c426-8f0a-49bd-a162-91b804e6055e
8/28/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		4	550	AFS std gill net	1	9b3ea6ee-082f-4d9e-8222-159c0a1055b9
8/28/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		5	550	AFS std gill net	1	#64355b7-429e-40f9-bf1e-dbc79d35adaf
8/28/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		6	550	AFS std gill net	1	02168c63-2a01-41c0-b077-631a52999515
8/29/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		10	550	AFS std gill net	1	3f12e279-90ff-4161-92e1-3167fb7c7c9
8/29/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		11	550	AFS std gill net	1	fd079b91-41b5-4459-b73d-8dc6e50c7836
8/29/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		12	550	AFS std gill net	1	0c225d01-5b9c-42ec-9cdd-a41b2af89e67
8/29/2018	UBS-Lake-409-800	Bitter	2216	22-0016-00	Day		7	550	AFS std gill net	1	a6f9d909-af2b-4e35-92ce-8c7f70181499

*We can't automate everything.... No matter how  
HARD we try!*



# 5. Public Access





Agency News Maps Events Forms & Permits Contact Us     

LICENSES HUNT FISH CAMP STATE PARKS THINGS TO DO CONSERVATION EDUCATION



# FISH

PURCHASE LICENSE

FISHING AREAS

> GAME SPECIES

ACCESSIBLE AREAS

AQUATIC INVASIVE SPECIES

> HATCHERIES

FISH SURVEYS, REPORTS AND MAPS

> NONMEANDERED

## Fish Surveys, Reports and Maps

**Fisheries Report Viewer**

Recent lake surveys and all stocking information is searchable in the Fisheries Reports viewer. Older reports and lake maps are also available below. Over time, all reports will be moved to the Fisheries Reports viewer. The end product will provide more historical fisheries information for your use. Thank you for your patience while the report viewer is under construction.

Related FAQ

Fishing Information  
Where can I fish on the Missouri River?

Related Maps

Other Fisheries Reports Searchable Map



Agency News Maps Events Forms & Permits Contact Us    

LICENSES HUNT FISH CAMP STATE PARKS THINGS TO DO CONSERVATION EDUCATION




# FISHERY REPORTS

Select By Report Type Select By Year Select By Counties Select By Waterbody


Clear Filters


Report Type	Year	County	Lake	Download
Creel Survey Report	2017	Day	Bitter (Day)	<a href="#">Download Report</a>
Creel Survey Report	2017	Marshall	Buffalo South (Marshall)	<a href="#">Download Report</a>
Creel Survey Report	2017	Marshall	Clear (Marshall)	<a href="#">Download Report</a>
Creel Survey Report	2017	Day	Enemy Swim (Day)	<a href="#">Download Report</a>
Creel Survey Report	2017	Charles Mix	Francis Case (Charles Mix)	<a href="#">Download Report</a>
Creel Survey Report	2017	Codington	Kampeska (Codington)	<a href="#">Download Report</a>
Creel Survey Report	2017	Dewey	Oahe (Dewey)	<a href="#">Download Report</a>
Creel Survey Report	2017	Hamlin	Poinsett (Hamlin)	<a href="#">Download Report</a>
Creel Survey Report	2017	Hughes	Sharpe (Hughes)	<a href="#">Download Report</a>
Creel Survey Report	2016	Day	Bitter (Day)	<a href="#">Download Report</a>

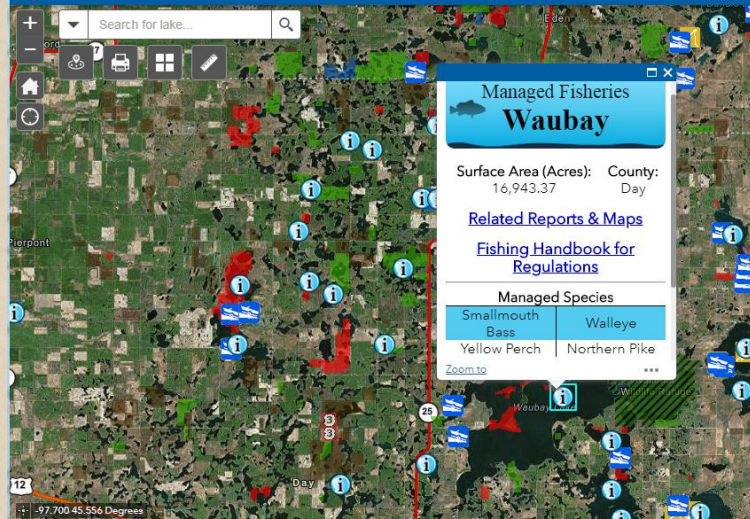


## South Dakota Public Fishing Access

South Dakota Game Fish and Parks



Search for lake... 



Managed Fisheries

Waubay

Surface Area (Acres): 16,943.37 County: Day

[Related Reports & Maps](#)

[Fishing Handbook for Regulations](#)

Managed Species

Smallmouth Bass

Walleye

Yellow Perch

Northern Pike

[Zoom to](#)

**Shorefishing**

**Aquatic Invasive Species**

**Public Lands**

Federal Lands Overview

National Forest

National Grassland

Bureau of Land Management

Bureau of Reclamation

Corps of Engineers

USDA Wildlife Refuge

# 5. Public Access



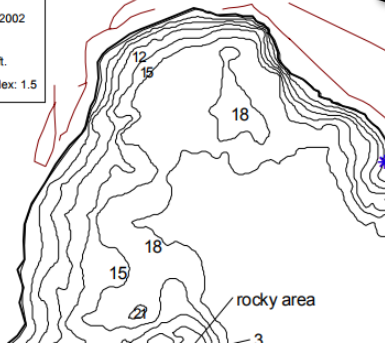
## South Dakota Department of Game, Fish and Parks

### Clear (Marshall) Stocking Report

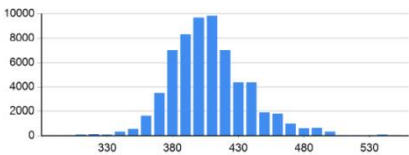
Year	Fish Species	Fish Stock Number*	Fish Size	Fish Per Pound	Stock Purpose
2017	Walleye	185	Large Fingerling	5.0	Maintenance
2017	Walleye	35,760	Large Fingerling	40.0	Maintenance
2017	Walleye	6,100	Large Fingerling	50.0	Maintenance
2017	Walleye	6,519	Large Fingerling	50.0	Maintenance
2016	Walleye	550,000	Fry		
2015	Walleye	550,000	Fry		
2014	Walleye	542,000	Fry		

### Clear Lake – Marshall county

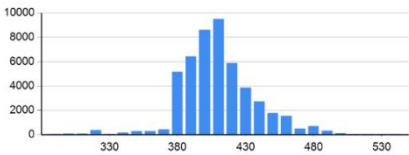
Map Creation: October, 2002      Sonar Survey: June, 2002  
Shoreline: Landsat 7, August, 2000  
Lake Area: 1170 acres      Maximum Depth: 22 ft.  
Mean Depth: 12.4 ft      Shoreline Development Index: 1.5



Length frequency of angler-harvested Walleye measured by the creel clerk during creel surveys on Sharpe.



Summer 2013  
N = 63591  
Mean TL = 408



Summer 2014  
N = 49209  
Mean TL = 410

### Creel and Lake Information

#### Lake Information

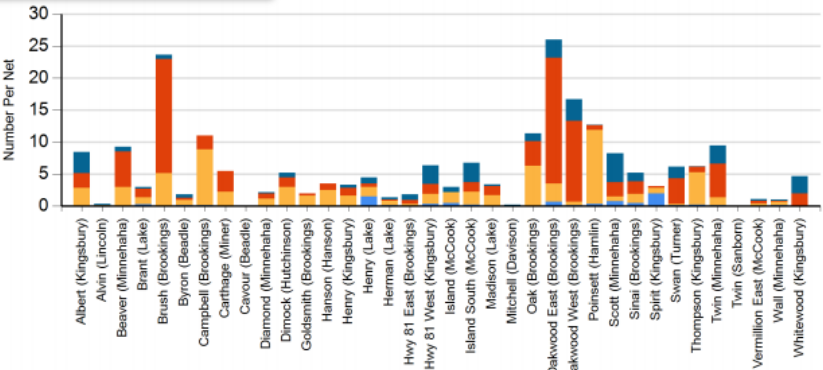
**Lake Name:** Clear  
**Lake Code:** UJA-Lake-917-001  
**Surface Area:** 492.64 Hectares  
**County:** Marshall  
**Start Date:** 5/14/2017  
**End Date:** 8/7/2017  
**Months Included:** May, June, July, August

Table 1. Percent of angling parties interviewed primarily targeting a species (or any species) by month and overall for Clear during 2016 - 2017. Any Species (ANY), Black Bullhead (BLB), Black Crappie (BLC), Bluegill (BLG), Largemouth Bass (LMB), Northern Pike (NOP), Smallmouth Bass (SMB), Walleye (WAE), Yellow Perch (YEP).

Year	Month	# of Interviews	Percent of Anglers Targeting								
			ANY	BLB	BLC	BLG	LMB	NOP	SMB	WAE	YEP
2017	May	18	0.0	0.0	0.0	22.2	0.0	0.0	22.2	38.9	0.0
	June	20	5.0	0.0	0.0	40.0	0.0	10.0	15.0	30.0	0.0
	July	20	25.0	0.0	0.0	25.0	0.0	0.0	5.0	40.0	0.0

### 2017 Walleye Gill Net Catches

10- 15 in    15- 20 in    > 20 in





# Bonus!! Analytics



**12,555 total downloads**

Waterbody	Report Type	# Downloads
Northeastern Area Lakes	Net Catch Graphs	185
Bitter	Creel Survey Report	179
Poinsett	Creel Survey Report	179
Thompson (Kingsbury)	Lake Maps	167
Southeastern Area Lakes	Net Catch Graphs	162
Sinai (Brookings)	Lake Maps	119
Waubay (Day)	Lake Maps	115
Enemy Swim	Creel Survey Report	110
Poinsett (Hamlin)	Lake Maps	109
Sinai (Brookings)	Lake Survey Report	104

# Where do we go from here...

- Take this initial phase slow before we add additional surveys
- Still working out some bugs
  - GIS staff don't speak the same language as Fisheries Biologists
  - Data analysis we weren't previously aware of
  - Every FMA and lake is truly "special"
    - To Account for every scenario is not possible.
- Previous software wasn't perfect so some mistakes were either rebuilt or needed to be fixed.





# Conclusion

- Constant **engagement** with staff is vital to the success of this database.
- **Feedback and discussion** is extremely important.
- **Standardization** of the fisheries department will be an ongoing process.
- Truly invaluable exercise for us as an agency
  - Apply what we learned elsewhere
  - Best management practices









@BERGERAARON

FACEBOOK · TWITTER · INSTAGRAM

**#SDINTHEFIELD**  
**SHARING THE**  
**STORIES OF YOU.**



@DEREKBAUNE



@JONKLEMME



@MGARRY85