Relational Databases: Getting the foundation right.

Keith Hurley
Nebraska Game and Parks Commission

Organization of Fish and Wildlife Information Managers

OFWIM

Leveraging Technology to Promote Natural Resource Management

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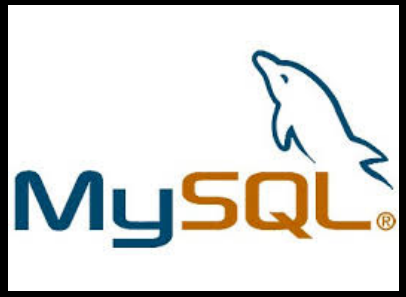
Microsoft
SQL Server


MySQL

ORACLE

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MERLIN
Data Resource Manager
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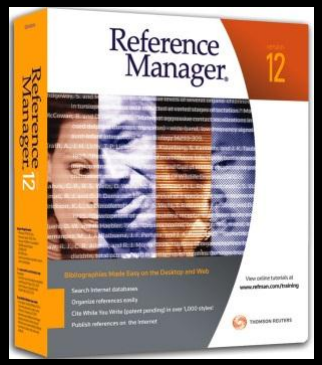
Reference Manager
12

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2013	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod			
193013 Cons	816,669.73	814,999.81	841,969.18
2013 Prepaid	83,213,781.48	8338,488.88	8813,919.88
Inc Revenues	81,168,527.88	8138,127.88	
Tvlc Revenue	83,216,418.48	8386,888.88	
Tvlc Basis	83,318,888.12	8271,884.81	

2014	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod			
193014 Cons	898,438.68	8879.81	831,638.24
2014 Prepaid	83,213,781.48	8338,488.88	8813,919.88
Inc Revenues	81,168,527.88	8138,127.88	
Tvlc Revenue	83,216,418.48	8386,888.88	
Tvlc Basis	83,388,824.88	8287,368.81	

2015	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod			
193015 Cons	(836,833.88)	8168.81	(81,884.84)
2015 Prepaid	83,213,781.48	8338,488.88	8813,919.88
Inc Revenues	81,168,527.88	8138,127.88	
Tvlc Revenue	83,216,418.48	8386,888.88	
Tvlc Basis	83,266,896.48	8286,781.81	

2016	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod			
193016 Cons	(836,442.88)	(8348.81)	81,368.94
2016 Prepaid	83,213,781.48	8338,488.88	8813,919.88
Inc Revenues	81,168,527.88	8138,127.88	
Tvlc Revenue	83,216,418.48	8386,888.88	
Tvlc Basis	83,281,764.88	8285,337.81	

2017	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod			
193017 Cons	(836,738.38)	(8363.78)	(811,131.34)
2017 Prepaid	83,213,781.48	8338,488.88	8813,919.88
Inc Revenues	81,168,527.88	8138,127.88	
Tvlc Revenue	83,216,418.48	8386,888.88	
Tvlc Basis	83,938,683.38	8388,132.81	

2018	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod			
193017 Cons	(836,33.88)	(81,874.78)	868,894.84
2018 Prepaid	83,213,781.48	8338,488.88	8813,919.88
Inc Revenues	81,168,527.88	8138,127.88	
Tvlc Revenue	83,216,418.48	8386,888.88	
Tvlc Basis	83,564,681.88	8388,888.81	

Pnnl Bdrbtrs	Tlc	Inface Bal-Prepaid	Inface Cnsl	NOTES
1 1-8b-0-24	Miscellaneous/Revenue of Ind Bdrbtrs	9814	8888,888	Cons Cnsl
1 1-8b-0-24	Revenue of Inds Mdbrs	9814	8486,818	Cons Cnsl/888
1 1-87-0-24	Ind Management	9814	8388,888	Cons Cnsl
1 1-83-88-28	Bonds Bdrbtrs	9814	8287,888	Cons Cnsl
1 1-8-0-12	Mdbrbtrd Bonus Contribtrs	9814	878,888	Cons Cnsl
1 1-183-0-8	Bonus Bdrbtrs	9814	8488,888	881 Ind
1 1-188-0-3	Improvng Bonus Bonus	9814	8361,888	888 Ind
1 1-188-0-3	Improvng Bonus Bonus	9814	8211,288	888 Ind
1 1-183-7-4	Income Bonus	9814	838,888	881 Ind
1 1-193-0-3	Recovered of dbtrs cost and chrd tr	9814	868,635	881 Ind
1 1-188-0-18	Bonds Inlc Inface Bonus	9814	8318,888	888 Cnsl/881
1 1-188-0-18	Bonds Inlc Inface Mnmgmnt	9814	878,888	888 Ind/ F
1 1M-1-2-73	Ind & Mdls Contribtrs	9814	881,888	Cons Cnsl
1 1-188-0-1	Rnd Cnsl 812	9814	8488,888	888
	ICB consdtrs 488 MOB, 188 BIB 14	9814	88	888
1 1-193-88-1	Pnnl BIBB Inlc Inc, ex CB cnsldtd ui	9814	8388,888	888
	(pnnlng, ex CB cnsldtd ui)	9814	88	888
1 1-188-0-1	Rnd Pnnl 812	9814	8188,888	888
1 1-194-88-1	Rnd Pnnl 812 - Cmpnts Cnsl	9814	88	888
	ICB consdtrs 788 MOB, 78 BIB1	9814	88	888
1 1-193-0-3	Trvel Bldrbgs & Trvl Bdrbtrs	9814	8878,888	881 Ind
1 1-193-0-4	Prdctrbtrs of Nrm Pnnl & Rdlnctrs	9814	8878,873	888 Ind
1 1-193-0-7	Prdtr Bnrs Cnfdrl Prnctrbtrs Bonuses	9814	8873,438	881 Ind
2 1-193-0-11	Immrcs Bnrcnmnnd of Bnrm Cs Bnrs	9814	868,438	888 Cnsl F Cons
Bnn Bnrcnl	Inlc McDrmnnlc Inlnrcs Bnrcnl	9814	8188,888	Cons Cnsl
2 1-193-7-13	Prnctrs Mdbrs	9814	88	Cons Cnsl
2 1M-21-0-18	MOBB Bdrbtrs	9814	878,888	Cons Cnsl
1 1M-1-1-34	Inlc Inc of Trvcs	9814	8488,888	Cons Cnsl
2 1M-19-7-13	Inclnrcs Inc Inrcnrctrbtrs Bnrs Mdbrbtrd Bnrs	9814	88	Cons Cnsl
2 1M-19-7-13	Inclnrcs Inc Inrcnrctrbtrs	9814	88	Cons Cnsl
2 1M-13-7-43	Inlcnrcnrcs Pnnnrs	9814	88	Cons Cnsl
1 1-193-0-3	Bnrs Bnrcnrs [Cnrnrs & Pnfnrcnrs]	9814	8388,888	888 Cnsl
1 1-193-0-3	Bnrcnlnnd Jnlnrs & Bnlnnrs			888 Ind
1 1-193-0-3	Bnrcnlnnd Mnmgmnnd Bnlnrs Bnrs			888 Ind
1 1-193-0-3	Bnrcnlnnd Inlnrs			888 Cnsl
1 888 888888	Cnnnrbtrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Cnnnrbtrs Bnrcnrs Bdrbtrbtrs Bnrs B 9814 8238,888 888 Cnsl
		9814	88	Bnrbtrs Bnrcnrs Bdrbtrbtrs 9814 8378,888
1 888 888888	Bnrbtrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrbtrs Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
		9814	88	9814 88
1 888 888888	Bnrbtrs Bnlnrs Mdls Bnlnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrbtrs Bnlnrs Mdls Bnlnrs Bdrbtrbtrs 9814 8188,888 888 Cnsl
1 888 888888	1-88 Bnrcnrs Bnrcnrs Pnnnrs	9814	888,888 888 Cnsl	1 1-88 Bnrcnrs Bnrcnrs Pnnnrs 9814 88 888 Cnsl
1 888 888888	Inrcnrs Inlc Bdrbtrbtrs	9814	88 888 Cnsl	1 Inrcnrs Inlc Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Bnrbtrs Bdrbtrbtrs Pnnnrd Bnrcnlnnrs	9814	878,888 888 Cnsl/881	1 Bnrbtrs Bdrbtrbtrs Pnnnrd Bnrcnlnnrs 9814 878,888 888 Cnsl/881
1 888 888888	Mdlnnrs Cnnd Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Mdlnnrs Cnnd Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
		9814	88	9814 88
1 888 888888	Trvcl Bldrcnrs Bnlnnrcnnd	9814	88 888 Cnsl/888	1 Trvcl Bldrcnrs Bnlnnrcnnd 9814 838,888 888 Cnsl/888
1 888 888888	Bnrcnn Cnnds Bnrcnrs Bdrbtrbtrs IPI	9814	88 888 Cnsl	1 Bnrcnn Cnnds Bnrcnrs Bdrbtrbtrs IPI 9814 88 888 Cnsl
		9814	88	9814 88
1 888 888888	BM Pnnls Bdrbtrbtrs Bbnnbtrs, Etc	9814	88 888 Cnsl	1 BM Pnnls Bdrbtrbtrs Bbnnbtrs, Etc 9814 888,888 888 Cnsl
		9814	88	9814 888,888
1 888 888888	Bnrbtrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrbtrs Bnrcnrs Bdrbtrbtrs 9814 8188,888 888 Cnsl
		9814	88	9814 8188,888
1 888 888888	Bnrl Inlc Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrl Inlc Bdrbtrbtrs 9814 88 888 Cnsl
		9814	88	9814 88
1 888 888888	Bnrbtrs Inrcnrs Bnrcnrs Bnrcnrd	9814	88 881 Ind	1 Bnrbtrs Inrcnrs Bnrcnrs Bnrcnrd 9814 878,888 881 Ind
1 888 888888	Pnnnrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Pnnnrs Bnrcnrs Bdrbtrbtrs 9814 8388,888 888 Cnsl
		9814	88	9814 8388,888
1 888 888888	Bnrnnrbtrd Bnl Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrnnrbtrd Bnl Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Cnrrn Inlc Bdrbtrbtrs	9814	88 888 Cnsl	1 Cnrrn Inlc Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	BnTTr Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 BnTTr Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Bnrcnrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrcnrs Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Bnrcnrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrcnrs Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Bnrbtrd Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnrbtrd Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Bnnnnn Inlc Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnnnnn Inlc Bdrbtrbtrs 9814 88 888 Cnsl
1 888 888888	Bnl Inc Inlc Bdrbtrbtrs	9814	88 888 Cnsl	1 Bnl Inc Inlc Bdrbtrbtrs 9814 88 888 Cnsl
2 888 888888	BBBBBBBB Bnrcnn Bnnnlnnc nnd Bnlnnrcnnd	9814	88 Cnsl Cnsl	2 BBBBBBBB Bnrcnn Bnnnlnnc nnd Bnlnnrcnnd 9814 88 Cnsl Cnsl
2 888 888888	Bnrcnrs Bnrcnrs Bdrbtrbtrs Bnrcnrs	9814	88 Cnsl Cnsl	2 Bnrcnrs Bnrcnrs Bdrbtrbtrs Bnrcnrs 9814 88 Cnsl Cnsl
2 888 888888	Bdrbtrs Inlc Bdrbtrbtrs	9814	88 ??	2 Bdrbtrs Inlc Bdrbtrbtrs 9814 88 ??
2 888 888888	Bnrcnrs Bnrcnrs Bdrbtrbtrs Inscnrbtrs nn Inl	9814	88 881 Ind	2 Bnrcnrs Bnrcnrs Bdrbtrbtrs Inscnrbtrs nn Inl 9814 88 881 Ind
2 888 888888	Bnrcnrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	2 Bnrcnrs Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
2 888 888888	Bnrcnrs Bnrcnrs Bdrbtrbtrs	9814	88 888 Cnsl	2 Bnrcnrs Bnrcnrs Bdrbtrbtrs 9814 88 888 Cnsl
2 888 888888	Inlc Bnrbtrs Bdrbtrbtrs	9814	88 888/Cn	2 Inlc Bnrbtrs Bdrbtrbtrs 9814 88 888/Cn
2 888 888888	Chlcnn Cnnd Pnnl Bdrbtrbtrs	9814	88 888 Cnsl	2 Chlcnn Cnnd Pnnl Bdrbtrbtrs 9814 88 888 Cnsl
1-17-0-0-6	BBBBBBBB	9814	88,868.99	
1M-10-7-38	BBBBBBBB	9814	8237.88	
1M-1-1-12	BBBBBBBB	9814	81,368.42	
1-83-0-4	BBBBBBBB	9814	8188,888.88	
1-183-0-4	BBBBBBBB	9814	8188,888.88	
1M-23-7-3	BBBBBBBB	9814	8463.36	
1M-16-1-24	BBBBBBBB	9814	84,388.87	
1-78-0-38	BBBBBBBB	9814	8231,271.47	
1-86-0-33	BBBBBBBB	9814	836,883.36	
1-91-0-1	BBBBBBBB	9814	83,218.34	
1-84-0-23	BBBBBBBB	9814	8293,633.14	

2013	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod	9814	9814	9814
2013 Rcvnlbl	83,868,187.88	8371,888.88	BBBBBBBB
2013 Revnnnd	8628,828.48	88.88	83,218.38
2013 Cnnnnnd	8628,828.48	8271,81	8231,828.34

2014	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod	9814	9814	9814
2014 Rcvnlbl	83,438,661.88	8387,888.88	BBBBBBBB
2014 Revnnnd	88.88	88.88	88.88
2014 Cnnnnnd	(8231,827.88)	8168.81	(81,884.84)

2015	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod	9814	9814	9814
2015 Rcvnlbl	83,378,388.88	8387,888.88	BBBBBBBB
2015 Revnnnd	88.88	88.88	88.88
2015 Cnnnnnd	(836,442.88)	(8348.81)	81,368.94

2016	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod	9814	9814	9814
2016 Rcvnlbl	83,449,888.88	8387,888.88	BBBBBBBB
2016 Revnnnd	88.88	88.88	88.88
2016 Cnnnnnd	(836,738.38)	(8363.78)	(811,131.34)

2017	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod	9814	9814	9814
2017 Rcvnlbl	83,864,888.88	8387,888.88	BBBBBBBB
2017 Revnnnd	88.88	88.88	88.88
2017 Cnnnnnd	(836,33.88)	(81,874.78)	868,894.84

2018	Rent Int	Rents Rl	Rnt Rev
Inface Bal-Prod	9814	9814	9814
2018 Rcvnlbl	83,481,888.88	8387,888.88	BBBBBBBB
2018 Revnnnd	88.88	88.88	88.88
2018 Cnnnnnd	(8231,828.34)	(81,874.78)	868,894.84

2016

2016	74%	8%	Sport Fish Restoration 18%
	Sport Fish	Aquatic Ed	Boating Access
Federal Sub-Progran	9514	9511	9521
FY2015 Carry Over	($16,653.60)	($248.59)	$1,260.94
2016 Preliminary	$2,112,781.40	$228,408.80	$513,919.80
Final Apportionmen	$1,185,637.00	$128,177.00	$288,398.00
Total Apportionmen	$3,298,418.40	$356,585.80	$802,317.80
Total Available	$3,281,764.80	$356,337.21	$803,578.74

	Priority	Subsidiary	Title	Federal Sub-Program	Federal Cost	*MATCH*
1	1	F-86-D-27	Maintenance/Operation of Fish Hatcheries	9514	$900,000	Game Cash
2	1	F-84-D-27	Renovation of Lentic Waters	9514	$466,000	Game Cash/AQH
3	1	F-87-R-27	Fish Management	9514	$386,250	Game Cash
4	1	F-82-AE-28	Aquatic Education	9511	$357,000	Game Cash
5	1	F-6-B-16	Motorboat Access Coordination	9521	$75,000	Game Cash
6	1	F-182-R-8	Angler Behavior	9514	$450,000	UNL Ind
7	1	~~F-188-D-2~~	~~Improving Angler Access~~	9514	~~$0~~	~~AQH Cash~~
7	1	F-188-D-6	Improving Angler Access	9514	$311,250	AQH Cash
8	1	FW-22-T-7	Invasive Species	9514	$35,000	UNL Ind
9	1	F-193-R-5	Assessment of white perch and striped bass in S	9514	$0	UNL Ind
10	1	F-75-R-34	Missouri River Studies	9514	$210,000	Game Cash/UNL Ind
11	1	F-118-R-17	Sandhills Lake Fisheries Management	9514	$0	SDSU Ind / Game
12	1	FW-6-C-76	Fish & Wildlife Coordination	9514	$51,000	Game Cash
13	1	F-184-B-1	Duck Creek #12	9521	$0	NRD
13	1		(CA committing 400 MBA, 100 SFR 14-15)	9514	$0	NRD
14	1	F-193-DB-1	Papio #15A (pending, no CA submitted yet)	9521	$0	NRD
14	1		(pending, no CA submitted yet)	9514	$0	NRD
15	1	~~F-185-B-1~~	~~West Papillion #5~~	9521		~~NRD~~
16	1	F-194-DB-1	Pigeon-Jones (Vince Kramper Lake)	9521	$0	NRD
16	1		(CA committing 750 MBA, 75 SFR)	9514	$0	NRD
17	1	~~F-192-R-2~~	~~Trout Stockings & Tier I/II Fishes~~	9514	~~$0~~	~~UNL Ind~~
18	1	~~F-190-R-5~~	~~Production of Yellow Perch in Nebraska~~	9514	~~$0~~	~~UNK Ind~~
19	1	~~F-176-R-8~~	~~Platte River Catfish Population Dynamics~~	9514	~~$0~~	~~UNL Ind~~
				9514	$0	
15	1		Branched Oak Rehabilitation		$0	AQH Cash
16	1		Goose Lake Rehabilitation		$0	AQH Cash
17	1		Red Tail Reservoir Rehabilitation		$0	AQH Cash
18	1		Willow Creek Reservoir Rehabilitation		$0	AQH Cash
19	1		Calamus Reservoir Rehabilitation		$0	AQH Cash
20	1		Rockford Reservoir Rehabilitation		$0	AQH Cash
21	1		Bowman Lake Rehabilitation		$0	AQH Cash
22	1		Red Fox Lake Rehabilitation		$0	AQH Cash
23	2		AKSARBEN Aquarium Remodeling and Enhancement		$0	Game Cash
24	2		Angler Access on Nebraska Rivers		$0	Game Cash
25	2		State Fair Exhibits		$0	??
26	2		Cormorant and Pelican Impacts on Fish		$0	UNL Ind
27	2		Beaver Dam Rehabilitation		$0	AQH Cash
28	2		Crazy Horse Rehabilitation		$0	AQH Cash
29	2		Lake Hastings Rehabilitation		$0	NRD/City
30	2		Chadron Creek Pond Rehabilitation		$0	AQH Cash

2016	Sport Fish	Aquatic Ed	Boating Access
Federal Sub-Progran	9514	9511	9521
2016 Expenditures	$3,649,500.00	$357,000.00	$915,000.00
2016 Recoveries	$0.00	$0.00	$0.00
2016 Carryover	($367,735.20)	($662.79)	($111,421.26)

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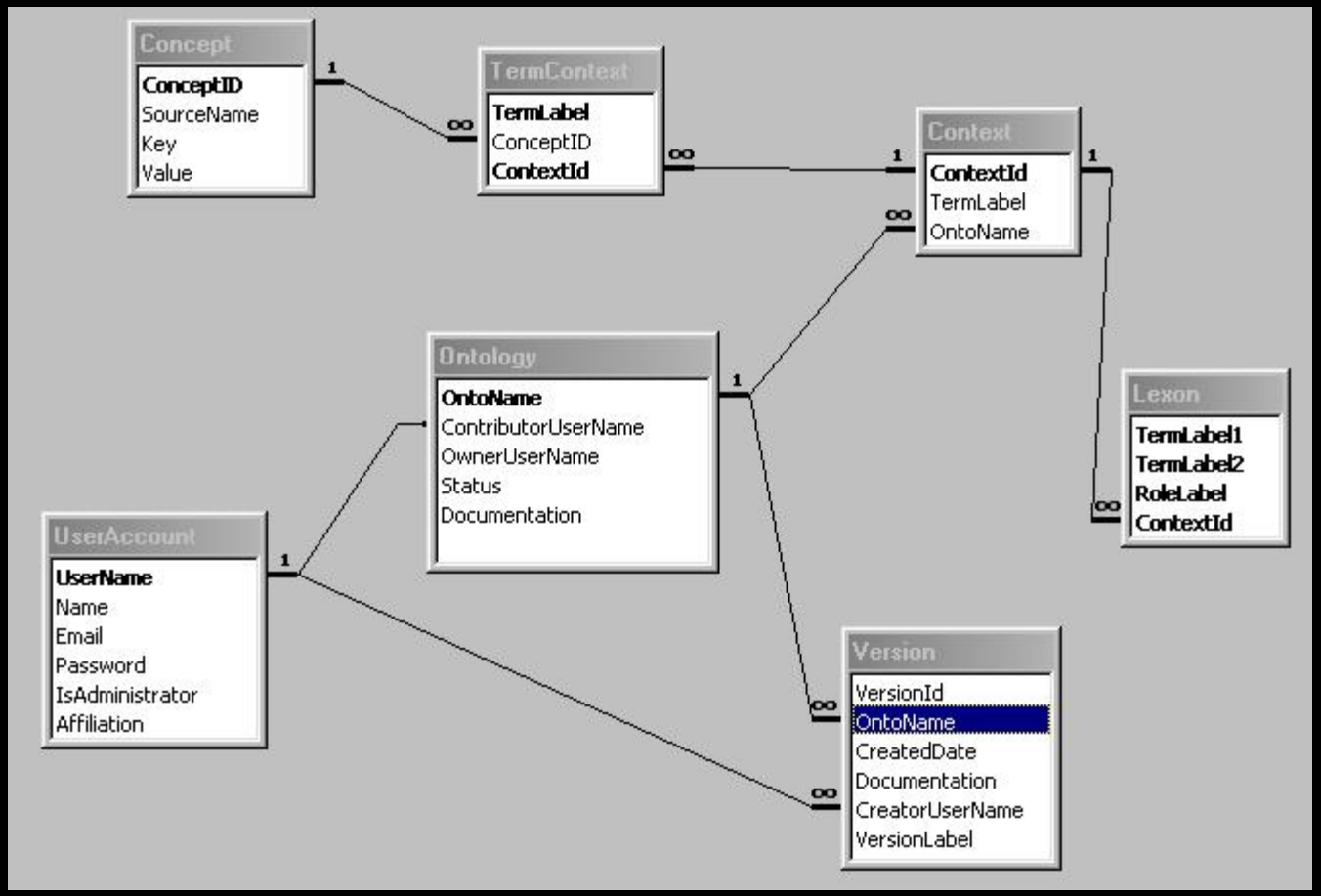
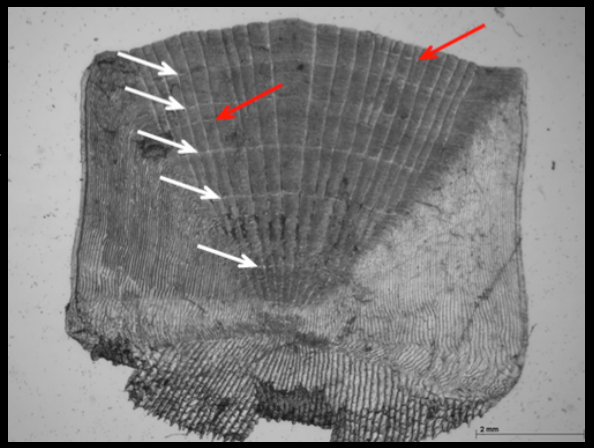
What is a relational database?



What is a relational database?



I’ve Learned So Much From My Mistakes…

I’m Thinking Of Making A Few More

Computers like numbers – avoid text

Don’t repeat repeat yourself

Every record must have a unique identifier

Use naming conventions

Use naming conventions

???_UID

???_???UID

???_*******

???_*******

Use naming conventions

???_UID

???_???UID

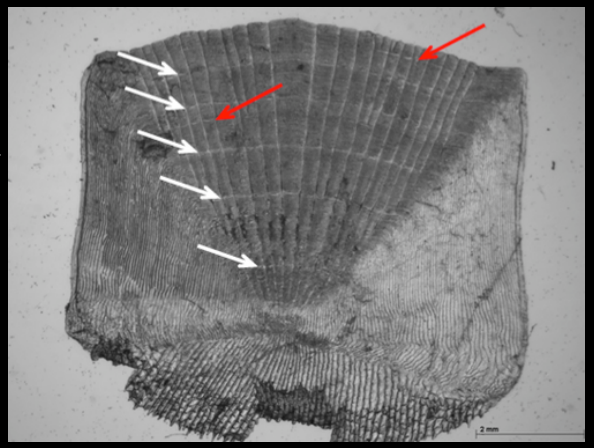
???_*******

???_*******

tbl*******

frm*******

qry*******



date	lake	site	gear	species	length	weight	age	a1	a2	a3	a4	edge
06/01/13	Round	Loon Point	Trap Net	bluegill	210	254	4	178	223	381	413	413
06/01/13	Round	Loon Point	Trap Net	bluegill	243	222	4	145	242	335	481	490
06/01/13	Round	Pintail Bay	Trap Net	bluegill	135	86	2	195	284			292
06/01/13	Round	West end of dam	Trap Net	redear	142							
06/25/13	Round	Loon Point	Trap Net	black bullhead	138							
06/25/13	Round	Pintail Bay	Trap Net	black bullhead	179							
06/25/13	Round	Big Creek mouth	Trap Net	bluegill	198	168	3	188	254	365		365
08/30/13	Square	Mallard Cove	Gill Net	walleye	854	355	4	113	241	384	476	484
08/30/13	Square	Whitetail Point	Gill Net	walleye	686	321	3	105	289	349		349
08/30/13	Square	Bobber Bay	Gill Net	white bass	312	211						230

date	lake	site	gear	species	length	weight	age	a1	a2	a3	a4	edge
06/01/13	Round	Loon Point	1	1	210	254	4	178	223	381	413	413
06/01/13	Round	Loon Point	1	1	243	222	4	145	242	335	481	490
06/01/13	Round	Pintail Bay	1	1	135	86	2	195	284			292
06/01/13	Round	West end of dam	1	2	142							
06/25/13	Round	Loon Point	1	3	138							
06/25/13	Round	Pintail Bay	1	3	179							
06/25/13	Round	Big Creek mouth	1	1	198	168	3	188	254	365		365
08/30/13	Square	Mallard Cove	2	4	854	355	4	113	241	384	476	484
08/30/13	Square	Whitetail Point	2	4	686	321	3	105	289	349		349
08/30/13	Square	Bobber Bay	2	5	312	211						230

tblGears

gear_UID	gear_Name
1	Trap Net
2	Gill Net

tblSpecies

spp_UID	spp_Name
1	bluegill
2	redear
3	black bullhead
4	walleye
5	white bass

date	site	gear	species	length	weight	age	a1	a2	a3	a4	edge
06/01/13	1	1	1	210	254	4	178	223	381	413	413
06/01/13	1	1	1	243	222	4	145	242	335	481	490
06/01/13	2	1	1	135	86	2	195	284			292
06/01/13	3	1	2	142							
06/25/13	1	1	3	138							
06/25/13	2	1	3	179							
06/25/13	4	1	1	198	168	3	188	254	365		365
08/30/13	5	2	4	854	355	4	113	241	384	476	484
08/30/13	6	2	4	686	321	3	105	289	349		349
08/30/13	7	2	5	312	211						230

tblLakes

lake_UID	lake_Name
1	Round
2	Square

tblSites

site_UID	Site_lakeUID	site_Name
1	1	Loon Point
2	1	Pintail Bay
3	1	West end of dam
4	1	Big Creek mouth
5	2	Mallard Cove
6	2	Whitetail Point
7	2	Bobber Bay

tblGears

gear_UID	gear_Name
1	Trap Net
2	Gill Net

tblSpecies

spp_UID	spp_Name
1	bluegill
2	redear
3	black bullhead
4	walleye
5	white bass

date	site	gear	species	length	weight	age	a1	a2	a3	a4	edge
06/01/13	1	1	1	210	254	4	178	223	381	413	413
06/01/13	1	1	1	243	222	4	145	242	335	481	490
06/01/13	2	1	1	135	86	2	195	284			292
06/01/13	3	1	2	142							
06/25/13	1	1	3	138							
06/25/13	2	1	3	179							
06/25/13	4	1	1	198	168	3	188	254	365		365
08/30/13	5	2	4	854	355	4	113	241	384	476	484
08/30/13	6	2	4	686	321	3	105	289	349		349
08/30/13	7	2	5	312	211						230

tblSets			
set_UID	set_Date	set_Site	set_Gear
1	6/1/2013	1	1
2	6/1/2013	2	1
3	6/1/2013	3	1
4	6/25/2013	1	1
5	6/25/2013	2	1
6	6/25/2013	4	1
7	8/30/2013	5	2
8	8/30/2013	6	2
9	8/30/2013	7	2

tblFish										
fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	a1	a2	a3	a4	edge
1	1	1	210	254	4	178	223	381	413	413
2	1	1	243	222	4	145	242	335	481	490
3	2	1	135	86	2	195	284			292
4	3	2	142							
5	4	3	138							
6	5	3	179							
7	6	1	198	168	3	188	254	365		365
8	7	4	854	355	4	113	241	384	476	484
9	8	4	686	321	3	105	289	349		349
10	9	5	312	211						230

tblSets

set_UID	set_Date	set_Site	set_Gear
1	6/1/2013	1	1
2	6/1/2013	2	1
3	6/1/2013	3	1
4	6/25/2013	1	1
5	6/25/2013	2	1
6	6/25/2013	4	1
7	8/30/2013	5	2
8	8/30/2013	6	2
9	8/30/2013	7	2

tblFish

fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	fish_edge
1	1	1	210	254	4	413
2	1	1	243	222	4	490
3	2	1	135	86	2	292
4	3	2	142			
5	4	3	138			
6	5	3	179			
7	6	1	198	168	3	365
8	7	4	854	355	4	484
9	8	4	686	321	3	349
10	9	5	312	211		230

tblAge

age_UID	age_fishUID	age_age	age_annulus
1	1	1	178
2	1	2	223
3	1	3	381
4	1	4	413
5	2	1	145
6	2	2	242
7	2	3	335
8	2	4	481
9	3	1	195
10	3	2	284
11	7	1	188
12	7	2	254
13	7	3	365
14	8	1	113
15	8	2	241
16	8	3	384
17	8	4	476
18	9	1	105
19	9	2	289
20	9	3	349

tblFish

fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	fish_edge
1	1	1	210	254	4	413
2	1	1	243	222	4	490
3	2	1	135	86	2	292
4	3	2	142			
5	4	3	138			
6	5	3	179			
7	6	1	198	168	3	365
8	7	4	854	355	4	484
9	8	4	686	321	3	349
10	9	5	312	211		230

tblAge

age_UID	age_fishUID	age_age	age_annulus
1	1	1	178
2	1	2	223
3	1	3	381
4	1	4	413
5	2	1	145
6	2	2	242
7	2	3	335
8	2	4	481
9	3	1	195
10	3	2	284
11	7	1	188
12	7	2	254
13	7	3	365
14	8	1	113
15	8	2	241
16	8	3	384
17	8	4	476
18	9	1	105
19	9	2	289
20	9	3	349

```
SELECT tblFish.fish_UID, tblAge.age_age, [Intercept]+([fish_length]-[Intercept])*([age_annulus]/[fish_edge]) AS LAA
FROM (tblSpecies INNER JOIN tblFish ON tblSpecies.spp_UID = tblFish.fish_sppUID) INNER JOIN tblAge ON tblFish.fish_UID = tblAge.age_fishUID;
```

tblFish						
fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	fish_edge
1	1	1	210	254	4	413
2	1	1	243	222	4	490
3	2	1	135	86	2	292
4	3	2	142			
5	4	3	138			
6	5	3	179			
7	6	1	198	168	3	365
8	7	4	854	355	4	484
9	8	4	686	321	3	349
10	9	5	312	211		230

tblAge			
age_UID	age_fishUID	age_age	age_annulus
1	1	1	178
2	1	2	223
3	1	3	381
4	1	4	413
5	2	1	145
6	2	2	242
7	2	3	335
8	2	4	481
9	3	1	195
10	3	2	284
11	7	1	188
12	7	2	254
13	7	3	365
14	8	1	113
15	8	2	241
16	8	3	384
17	8	4	476
18	9	1	105
19	9	2	289
20	9	3	349

```
SELECT tblFish.fish_UID, tblAge.age_age, [Intercept]+([fish_length]-[Intercept])*([age_annulus]/[fish_edge]) AS LAA
FROM (tblSpecies INNER JOIN tblFish ON tblSpecies.spp_UID = tblFish.fish_sppUID) INNER JOIN tblAge ON tblFish.fish_UID = tblAge.age_fishUID;
```

tblFish										
fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	a1	a2	a3	a4	edge
1	1	1	210	254	4	178	223	381	413	413
2	1	1	243	222	4	145	242	335	481	490
3	2	1	135	86	2	195	284			292
4	3	2	142							
5	4	3	138							
6	5	3	179							
7	6	1	198	168	3	188	254	365		365
8	7	4	854	355	4	113	241	384	476	484
9	8	4	686	321	3	105	289	349		349
10	9	5	312	211						230

```
SELECT tblFish.fish_UID, tblAge.age_age, [Intercept]+([fish_length]-[Intercept])*([age_annulus1]/[fish_edge]) AS LAA1, [Intercept]+([fish_length]-
[Intercept])*([age_annulus2]/[fish_edge]) AS LAA2, [Intercept]+([fish_length]-[Intercept])*([age_annulus3]/[fish_edge]) AS LAA3, [Intercept]+
([fish_length]-[Intercept])*([age_annulus4]/[fish_edge]) AS LAA4 FROM (tblSpecies INNER JOIN tblFish ON tblSpecies.spp_UID = tblFish.fish_sppUID)
INNER JOIN tblAge ON tblFish.fish_UID = tblAge.age_fishUID;
```

tblFish

fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	fish_edge
1	1	1	210	254	4	413
2	1	1	243	222	4	490
3	2	1	135	86	2	292
4	3	2	142			
5	4	3	138			
6	5	3	179			
7	6	1	198	168	3	365
8	7	4	854	355	4	484
9	8	4	686	321	3	349
10	9	5	312	211		230

tblAge

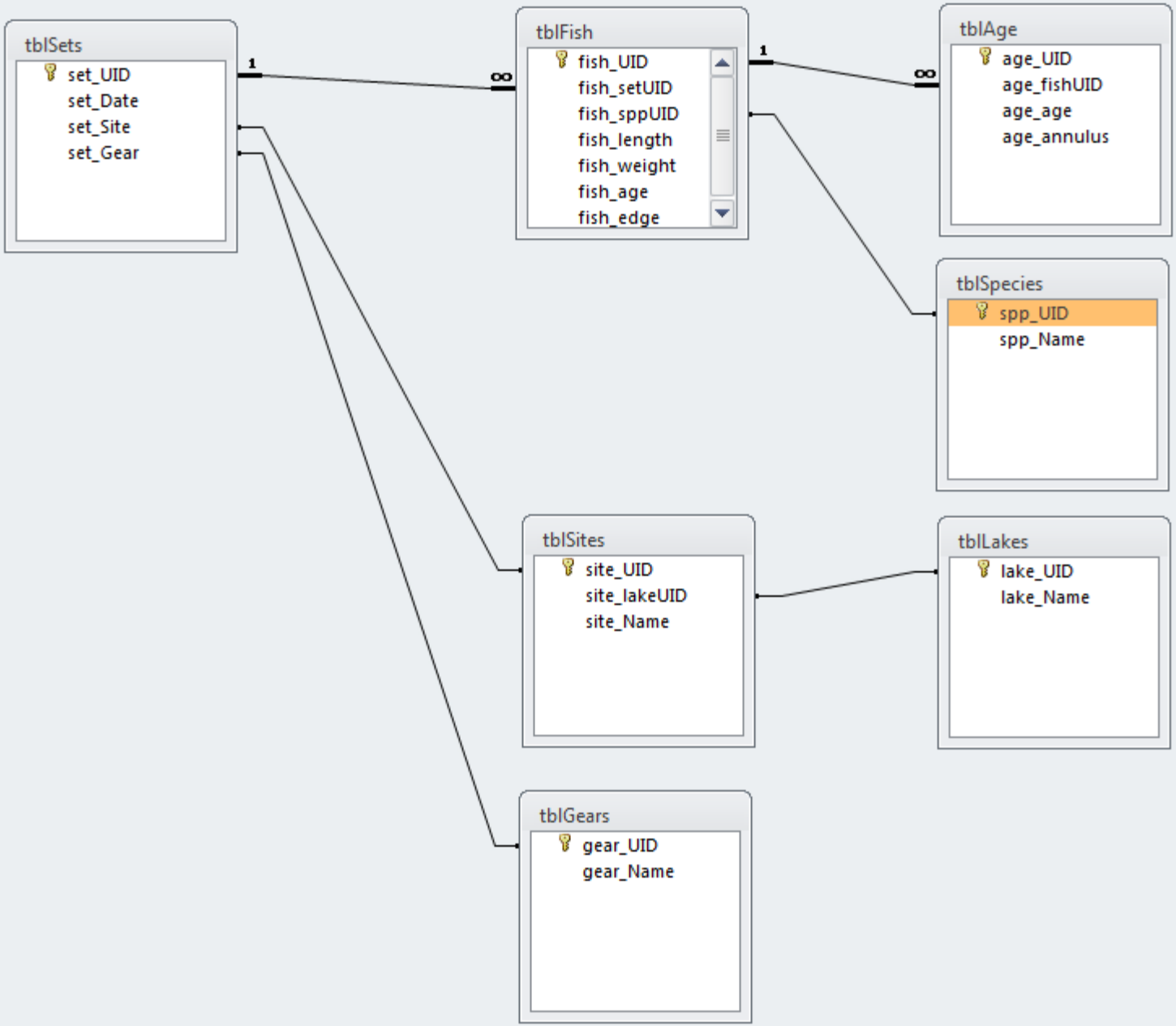
age_UID	age_fishUID	age_age	age_annulus
1	1	1	178
2	1	2	223
3	1	3	381
4	1	4	413
5	2	1	145
6	2	2	242
7	2	3	335
8	2	4	481
9	3	1	195
10	3	2	284
11	7	1	188
12	7	2	254
13	7	3	365
14	8	1	113
15	8	2	241
16	8	3	384
17	8	4	476
18	9	1	105
19	9	2	289
20	9	3	349

```
SELECT tblFish.fish_UID, tblAge.age_age, [Intercept]+([fish_length]-[Intercept])*([age_annulus]/[fish_edge]) AS LAA
FROM (tblSpecies INNER JOIN tblFish ON tblSpecies.spp_UID = tblFish.fish_sppUID) INNER JOIN tblAge ON tblFish.fish_UID = tblAge.age_fishUID;
```

tblFish

fish_UID	fish_setUID	fish_sppUID	fish_length	fish_weight	fish_age	a1	a2	a3	a4	edge
1	1	1	210	254	4	178	223	381	413	413
2	1	1	243	222	4	145	242	335	481	490
3	2	1	135	86	2	195	284			292
4	3	2	142							
5	4	3	138							
6	5	3	179							
7	6	1	198	168	3	188	254	365		365
8	7	4	854	355	4	113	241	384	476	484
9	8	4	686	321	3	105	289	349		349
10	9	5	312	211						230

```
SELECT tblFish.fish_UID, tblAge.age_age, [Intercept]+([fish_length]-[Intercept])*([age_annulus1]/[fish_edge]) AS LAA1, [Intercept]+([fish_length]-
[Intercept])*([age_annulus2]/[fish_edge]) AS LAA2, [Intercept]+([fish_length]-[Intercept])*([age_annulus3]/[fish_edge]) AS LAA3, [Intercept]+
([fish_length]-[Intercept])*([age_annulus4]/[fish_edge]) AS LAA4, [Intercept]+([fish_length]-[Intercept])*([age_annulus5]/[fish_edge]) AS LAA5,
[Intercept]+([fish_length]-[Intercept])*([age_annulus6]/[fish_edge]) AS LAA6, [Intercept]+([fish_length]-[Intercept])*([age_annulus7]/[fish_edge]) AS
LAA7, [Intercept]+([fish_length]-[Intercept])*([age_annulus8]/[fish_edge]) AS LAA8, [Intercept]+([fish_length]-[Intercept])*([age_annulus9]/[fish_edge])
AS LAA9, [Intercept]+([fish_length]-[Intercept])*([age_annulus10]/[fish_edge]) AS LAA10 FROM (tblSpecies INNER JOIN tblFish ON tblSpecies.spp_UID =
tblFish.fish_sppUID) INNER JOIN tblAge ON tblFish.fish_UID = tblAge.age_fishUID;
```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set_UID
set_Date
set_Site
set_Gear
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∞
tblFish
fish_UID
fish_setUID
fish_sppUID
fish_length
fish_weight
fish_age
fish_edge
1
∞
tblAge
age_UID
age_fishUID
age_age
age_annulus
tblSpecies
spp_UID
spp_Name
tblSites
site_UID
site_lakeUID
site_Name
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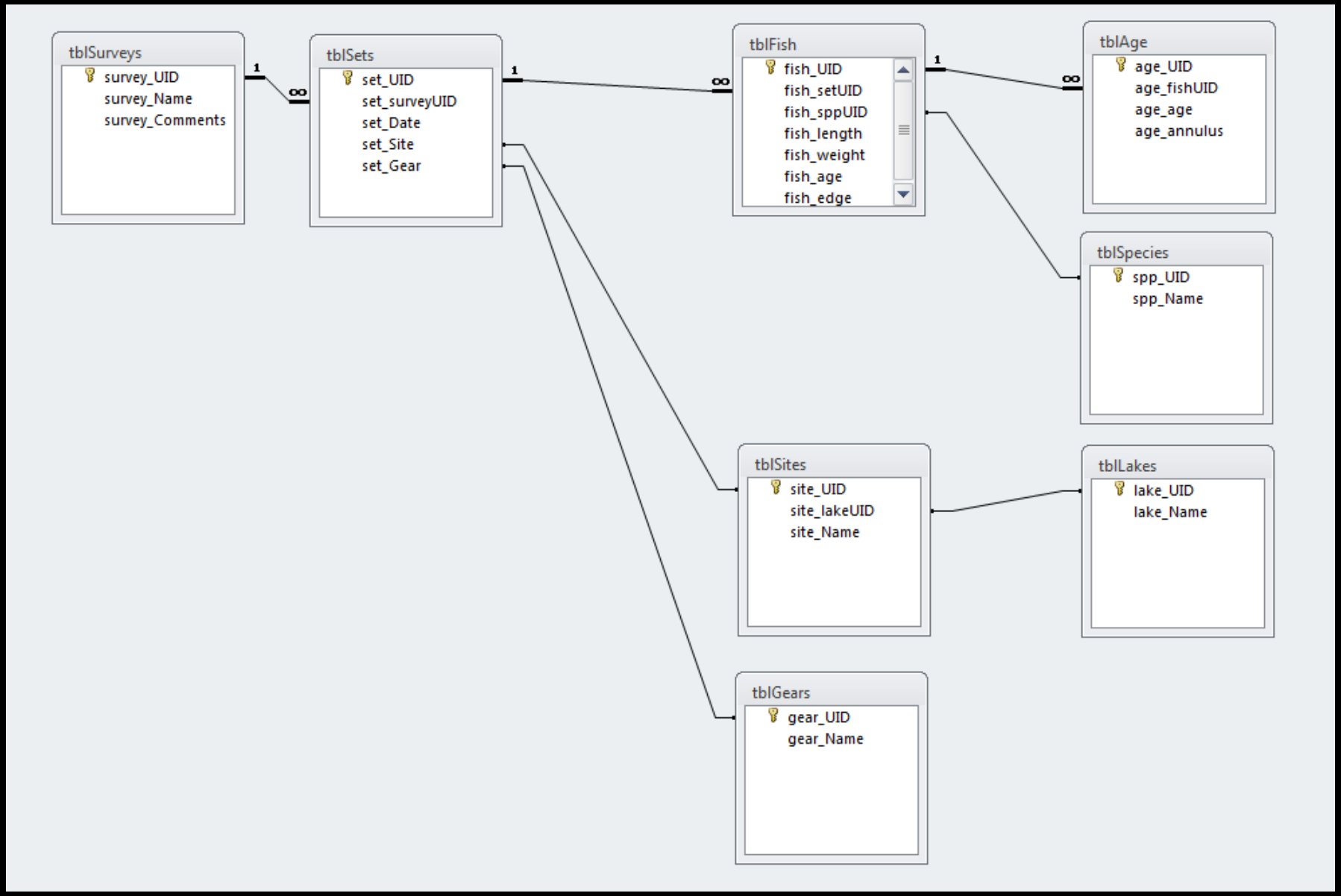
lake_Name
tblGears
gear_UID
gear_Name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survey_UID
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set_Date
set_Site
set_Gear
tblFish
fish_UID
fish_setUID
fish_sppUID
fish_length
fish_weight
fish_age
fish_edge
tblAge
age_UID
age_fishUID
age_age
age_annulus
tblSpecies
spp_UID
spp_Name
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tblLakes
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lake_Name
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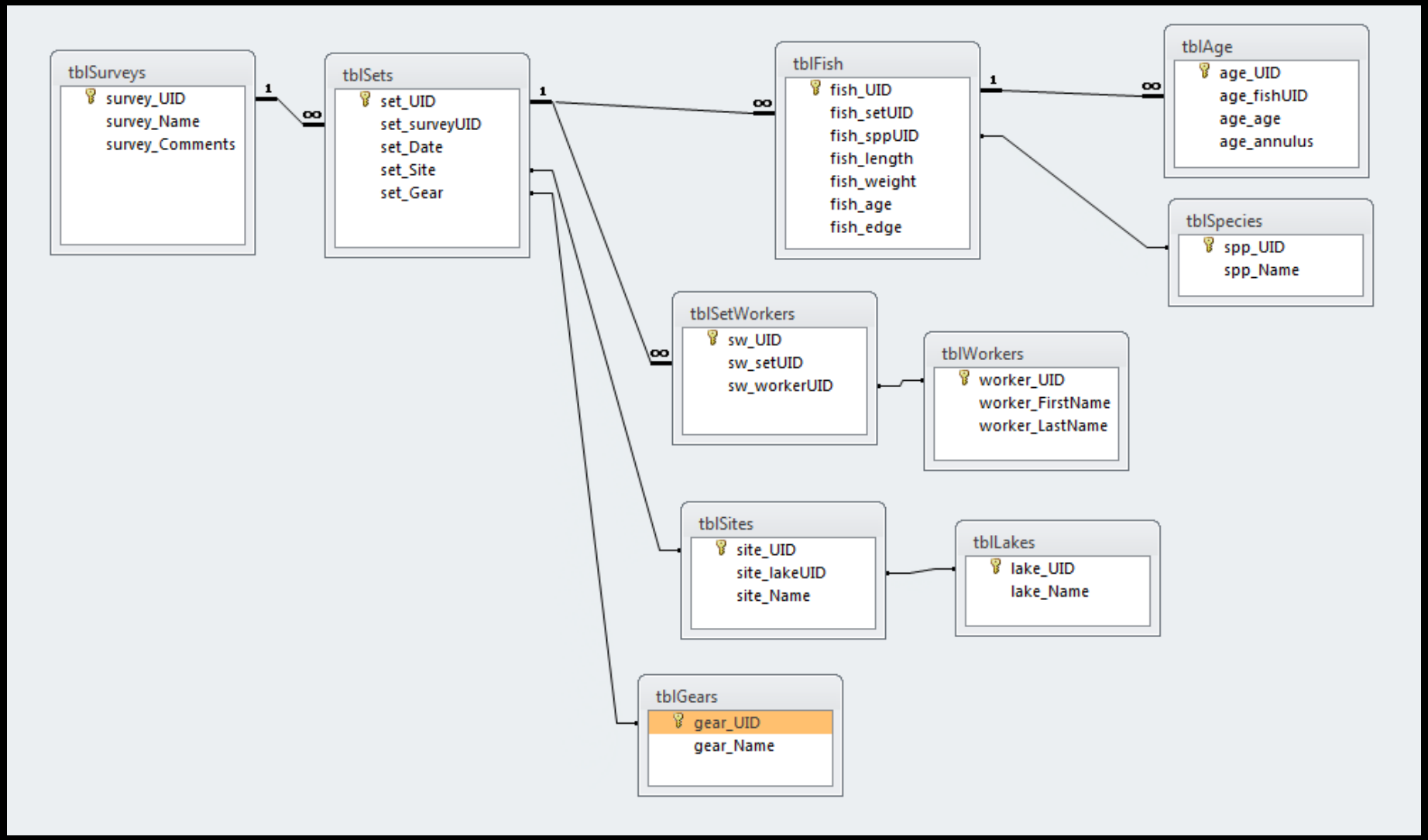
gear_UID
gear_Name
1
∞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survey_Name
survey_Comments
tblSets
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set_Site
set_Gear
tblFish
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fish_setUID
fish_sppUID
fish_length
fish_weight
fish_age
fish_edge
tblAge
age_UID
age_fishUID
age_age
age_annulus
tblSpecies
spp_UID
spp_Name
tblSetWorkers
sw_UID
sw_setUID
sw_workerUID
tblWorkers
worker_UID
worker_FirstName
worker_LastName
tblSites
site_UID
site_lakeUID
site_Name
tblLakes
lake_UID
lake_Name
tblGears
gear_UID
gear_Name
1
∞

Test

Field Name	Data Type
TestID	AutoNumber
Test	Text

Text
Memo
Number
Date/Time
Currency
AutoNumber
Yes/No
OLE Object
Hyperlink
Attachment
Lookup Wizard...

Field Properties

NOTICE
SHIRTS & SHOES
REQUIRED

Enter Survey Data

Survey: Round Lake 2013

Comments: Standard bluegill survey

Date	Site	Gear Type	
6/1/2013	Loon Point	Trap Net	Edit Fish
6/1/2013	Pintail Bay	Trap Net	Edit Fish
6/1/2013	West end of dam	Trap Net	Edit Fish
*			

Enter Survey Data

Survey: Round Lake 2013

Comments: Standard bluegill survey

Date	Site	Gear Type	

Enter Survey Data | Edit Fish

6/1/2013 Trap Net
Round Lake
Loon Point

Species	Length	Weight	Age	Edge	
bluegill	210	254	4	413	Edit Annuli
bluegill	243	222	4	490	Edit Annuli

Enter Survey Data

Survey: Round Lake 2013

Comments: Standard bluegill survey

Date	Site	Gear Type

Enter Survey Data | Edit Fish

6/1/2013 Trap Net
Round Lake
Loon Point

Species	Length	Weight	Age	Edge	
bluegill	210	254	4	413	Edit
bluegill	243	222	4	490	Edit

Edit Annuli

Annuli Measurements

Age	Annulus
1	178
2	223
3	381
4	413

Structured
Query
Language

Select Queries

Select A From B Where C

When did I set trap nets?

Select set_date From tblSets Where set_gear = 1

When did I set trap nets?

Select **Distinct** set_date From tblSets Where set_gear = 1

Opps, I meant what months.

```
Select Distinct month(set_date)
From tblSets Where set_gear = 1
```

How many bluegill
did I age?

```
SELECT Count(tblFish.fish_UID) as NumberOfFish
FROM tblFish
HAVING Not (tblFish.fish_age) Is Null AND
tblFish.fish_sppUID=1
```

Wow,
wouldn’t it be cool….