Tributary Strategies Scenario Builder

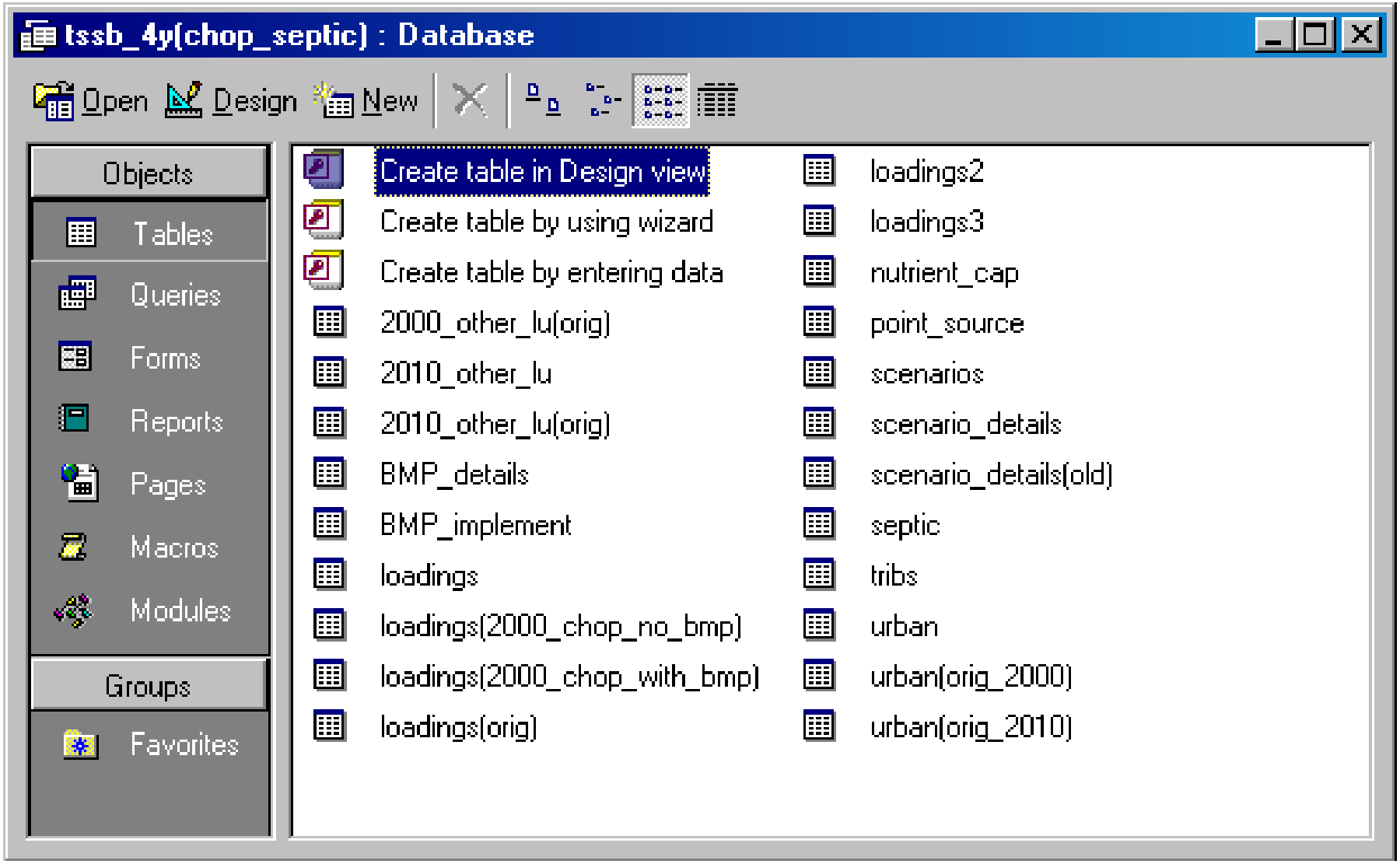
Kevin Coyne

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

What is the scenario builder?

- A tool to assist the Tributary Teams in making choices about the level of BMP implementation in their Tributary Strategies
- Microsoft Access 2000 database project
- Gathers information from tables of landuse acres, tributary specific loading rates, best management practice (BMP) efficiencies and costs, and BMP implementation

Data Tables


tssb_4y(chop_septic) : Database
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Urban Landuse Table

urban : Table

Trib_basin	ImpUrbOld	ImpUrbRec	ImpUrbNew	PervUrbOld	PervUrbRec	PervUrbNew
Choptank	5113	762	865	17583	2578	1977
Lower Eastern Shore	9905	1629	1530	28692	2911	3168
Lower Potomac	13534	4942	3238	51727	12125	15243
Lower Western Shore	18524	5092	1481	38930	10463	2872
Middle Potomac	59984	12350	4827	108759	15929	15174
Patapsco/Back	77143	7684	4972	93290	11996	12310
Patuxent	34623	14013	7395	91772	29440	31540
Upper Eastern Shore	8887	2464	1760	25642	4277	5695
Upper Potomac	30650	6101	5818	54627	8385	14765
Upper Western Shore	25113	5723	4345	49778	7192	13940
Testing	25113	5723	4345	49778	7192	13940

Record: 1 of 11

Other Landuses Table

2010_other_lu : Table

Trib_basin	Hitill	Lowtill	Hay	Pasture	Manure	MixOpen	Forest	AtmDep
Choptank	54991	136810	2554	5044	41	50150	138158	6659
Lower Eastern Shore	76087	157926	5297	9675	68	117335	527316	16175
Lower Potomac	37379	12837	8947	10607	7	42490	268350	4928
Lower Western Shore	5133	2975	1511	2347	1	8819	74693	3038
Middle Potomac	13938	20837	9474	11145	10	31776	106201	5829
Patapsco/Back	20089	23175	11922	14679	41	30487	114500	5136
Patuxent	30446	25640	13376	20914	14	60218	253420	5743
Upper Eastern Shore	97324	162292	11747	22113	99	60212	195914	9136
Upper Potomac	80352	139521	90811	110322	427	126031	656073	12999
Upper Western Shore	47557	44527	20289	32177	76	79728	272016	10820

Record: 1 of 10

Delivered Loading Rate Table

loadings3 : Table

lr_scen	Trib_basin	LU_code	nit_lr	phos_lr
lr2000nobmp	Choptank	Pervurb	8.8753	1.304198
lr2000nobmp	Choptank	Pasture	10.935	1.645170
lr2000nobmp	Choptank	Mixopen	5.0621	0.898903
lr2000nobmp	Choptank	Manure	2289.6	283.7275
lr2000nobmp	Choptank	Lowtill	20.648	1.531746
lr2000nobmp	Choptank	Impurb	8.1114	0.513381
lr2000nobmp	Choptank	Hitill	26.128	2.632158
lr2000nobmp	Choptank	Hay	7.6441	1.070808
lr2000nobmp	Choptank	Forest	1.6323	0.024083

Record: 1 of 200

BMP Details Table

BMP_details : Table

BMP_code	BMP_cost	BMP_unit	BMP_nit_eff	BMP_phos_eff
AWMSL	4236	system	0.75	0.75
AWMSP	1775	system	0.3	0.3
BF	187	ac	0.57	0.7
BG	140	ac	0.43	0.53
CC	25	ac	0.58	0
CT	17	ac	0	0
ESC	2500	ac	0.33	0.5
ESM	315	ac	0.33	0.46
FC	30	ac	0	0
NMP	6	ac	0.3	0.2
RC	471	system	0.1	0.1
RHEL	120	ac	0.2	0.59
SCWQP	35	ac	0.12	0.17
SEPTIC	0		0	0
SMC	315	ac	0.33	0.46
SMR	315	ac	0.33	0.46
SPWF	100	ac	0.75	0.75
SPWOF	67	ac	0.38	0.38
TP	40	ac	0	0
UNM	0	ac	0.17	0.22
YR	0	ac	0.26	0.17
*	0		0	0

Record: 1 of 21

BMP Implementation Table

BMP_implement : Table

Trib_code	BMP_code	prog_2000
chop	NMP	142197
chop	CC	17056
chop	CT	42970
chop	SCWQP	151703
chop	BF	356
chop	BG	1339
chop	RHEL	71
chop	ESM	532
chop	SMR	0
chop	SMC	0
chop	TP	905
chop	FC	343
chop	ESC	164

Record: 1 of 290

Nutrient Cap Table

nutrient_cap : Table

Trib_basin	N_cap	P_cap
Choptank	2953189	295686
Lower Eastern Shore	5007508	572921
Lower Potomac	1590548	157438
Lower Western Shore	814881	114663
Middle Potomac	4657613	250371
Patapsco/Back	9787286	549172
Patuxent	2085315	206754
Upper Eastern Shore	3640533	305789
Upper Potomac	4950171	499258
Upper Western Shore	2450344	201187
Testing	10000	90000

Record: 1 of 11

Point Source Loads Table

point_source : Table

Trib_basin	prog_2kn	mgl_8n	mgl_5n	mgl_3n
Choptank	215665.75	223058.47	223063.69	155040.25
Lower Eastern Shore	578804.19	318100.79	318100.79	216623.2
Lower Potomac	390483.8	263685.86	263685.86	173869.09
Lower Western Shore	279422.98	385518.79	385518.38	249882.85
Middle Potomac	4273693.93	4627245.17	4626277.36	3044096.77
Patapsco/Back	8267820.05	6904094.58	6369465.7	4762116.32
Patuxent	984033.29	1443091.54	1398821.8	905897.49
Upper Eastern Shore	294035.3	197259.51	197259.51	151545.78
Upper Potomac	1308921.59	1020524.65	974942.51	670349.28
Upper Western Shore	623602.77	531845.16	531845.17	354732.45

Record: 1 of 10

Septic Loads Table

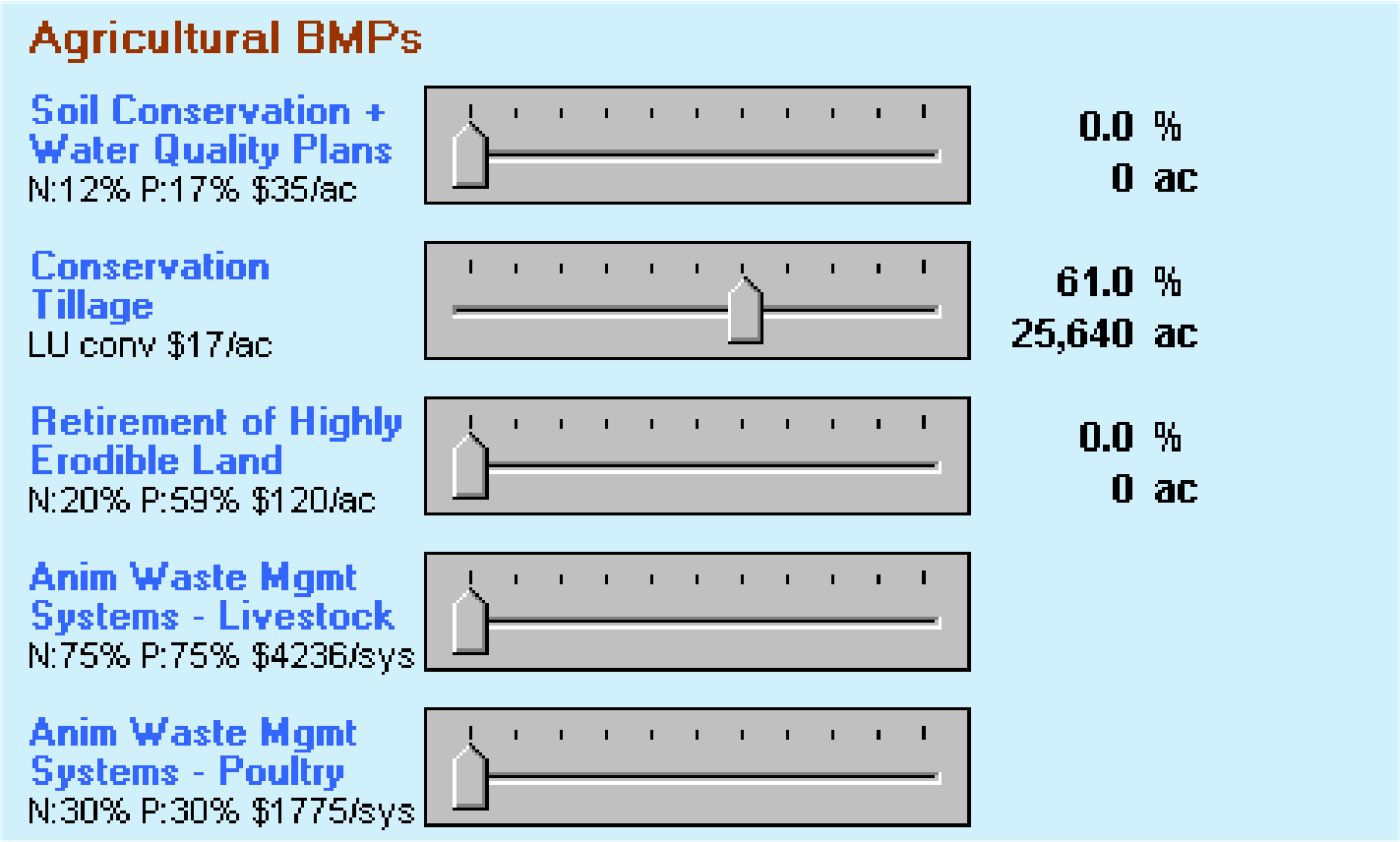
septic : Table

Trib_basin	prog_2kn	prog_2kp
Choptank	129189.75	0
Lower Eastern Shore	272428.4	0
Lower Potomac	256535.57	0
Lower Western Shore	428410	0
Middle Potomac	257933.71	0
Patapsco/Back	325654.01	0
Patuxent	434285.8	0
Upper Eastern Shore	266976.56	0
Upper Potomac	525440.52	0
Upper Western Shore	449391.8	0

Record: 1 of 10

How is a scenario created?

- Accepts user input from slider controls that represent BMP implementation



How are the resulting loads estimated?

- Calculates the estimated nutrient loads delivered to the Chesapeake Bay and the cost of BMP implementation using Visual Basic for Applications programming language
- Loads resulting from the input BMP implementation are calculated using rules of the Chesapeake Bay Program's Phase 4.3 Watershed Model

Nutrient Loading Rate Calculation

$$\text{Loading Rate (lb/ac)} = \mathbf{LU} \times \mathbf{LR} \times (1 - \mathbf{E}/100)$$

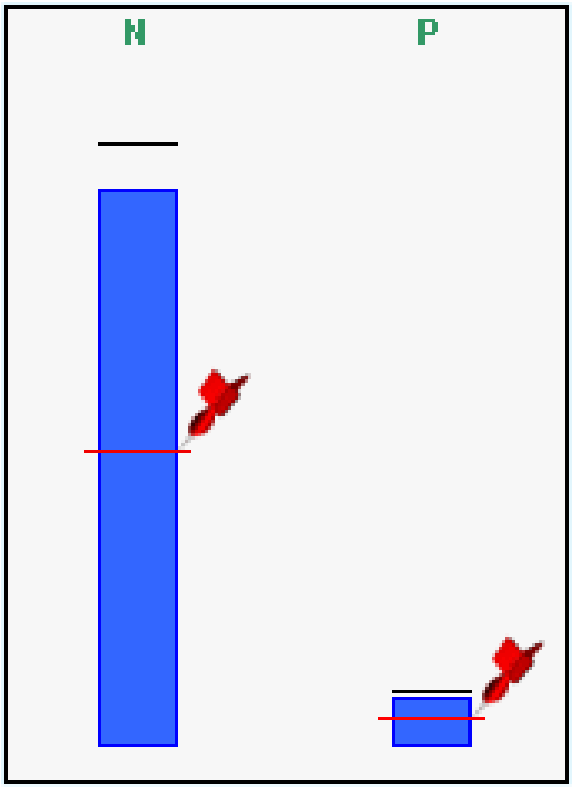
where, **LU** = landuse (acres)

LR = nutrient loading rate (pounds/acre)

E = BMP reduction efficiency (%)

Scenario Builder Output

- The scenario builder outputs estimated nutrient loads and associated costs graphically and in tabular format



Nitrogen Load (lbs/yr):	Phosphorus Load (lbs/yr):	
4,249,779	377,558	Start
3,932,402	346,916	Adjusted
2,085,315	206,754	Target
$2.11	$21.88	
Cost per pound per year		

$670,563
Cost per year

Development of the Scenario Builder

- Developed through meetings with the Maryland Tributary Strategies Development Workgroup
- Workgroup included representatives from other State agencies, local governments and Tributary Teams

What are the limitations of the tool?

- The scenario builder estimates loads at the Tributary Strategy Basin scale
- With present data, cannot be used as a local planning tool since loads are estimated at such a large scale
- In the future, as implementation data is collected at a finer scale and the CBP Phase V Watershed Model is developed, output at a smaller scale may be possible

Can the underlying data be updated?

- Yes, landuse, BMP efficiency and costs, and other data in tables can be changed by the user
- Updated by CBP for use in other states