

Using Report Cards for Watershed Health

Healthy Stream Portal
October 26, 2012



Lilian Busse

San Diego Regional Board

Karen Worcester

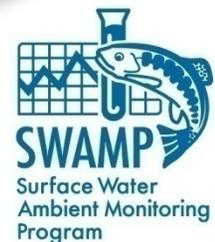
Central Coast Regional Board

John Hunt

Bay Foundation of Morro Bay, and UC Davis

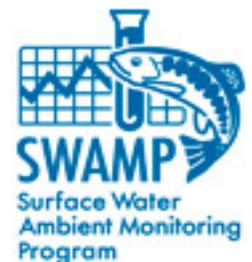
Dave Paradies

Bay Foundation of Morro Bay



Overview

- General thoughts on report cards (Lilian)
- Visualization of report cards (Lilian)
- Indicators and endpoints of report cards (John)
- Methods of integration and aggregation (John)
- Thresholds, scoring, and scoring example of indicators (John, Karen)
- Next Steps (John, Karen, and Lilian)



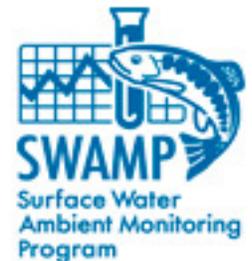
Definition of Report Cards

***report cards* plural of *re-port card* (Noun)**

- Noun: A teacher's written assessment of a student's work, progress, and conduct, sent home to a parent or guardian.
- An evaluation of performance.

Translated for the Watershed

- *A (stakeholder's/agency's/etc.) written assessment of the watershed's status and trend sent to the public.*
- *An evaluation of performance (of WQ programs and/or management decisions).*



semesters

Legend

McCALL MIDDLE SCHOOL
458 Main Street
Winchester, MA 01890
YEAR: 2011-2012
School Message:
Enjoy Your Summer Vacation
School opens September 5, 2012

Mark Interpretations	
Letter Grade	
A Outstanding	P Passing
B Above Average	F Not Passing
C Average	M Medical Excuse
D Below Average	I Incomplete

Vincent Vollmayr			
LASID	GRADE	ROOM	COUNSELOR
1607130	08	E104	M. Heckley

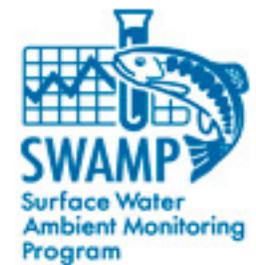
Attendance Record				
	TRJ 1	TRJ 2	TRJ 3	YTD
Absent	3.00	0.00	1.00	4.00
Tardy	0.00	0.00	0.00	0.00

SUBJECT & COURSE NUMBER	Teacher	TRJ 1	TRJ 2	TRJ 3	YTD	Comments
PE 8 Gilder/Kasprz.		A	A	A+		A
English 8 Walker, M		B+	A-	B+		B- B+
Italian 8 Arena, P		A+	A+	A-		A- A+
US Hist Muloney, K		A	A	A		B A
Spanish 8 Muller, S		B+	A-	B+		A+ A- Consistently excellent work
ITE 8 Huggins, E		A	A-	A		A A-
Art 8 Schmidt, L				A	A	A
Gen Mus 8 Castello, M				A	A	A
InfoTech 8 Kerkerian, A				A+	A+	A+
FCS/HHs 8 Finnson, N			A-	A+		A
Tech 8 Awizius, T				A	A-	A-

THE PARENT/GUARDIAN OF: Vollmayr, Vincent Magnus
14 Park Avenue
Winchester, MA 01890

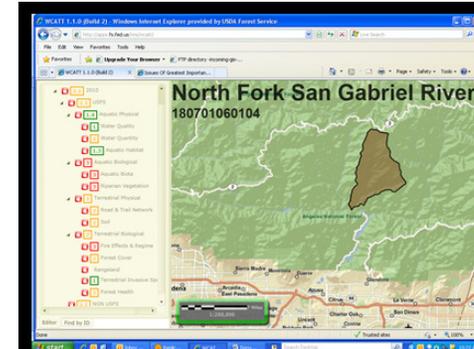
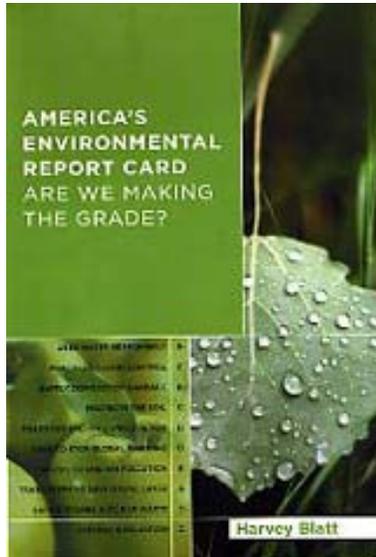
Courses

Grades



Report Card

Category	Indicator	Metric	Score
Landscape Condition	Development	Impervious surface Fragmentation	65 ₊₁₃
Biotic Condition	Native fish	Out-migrants Habitat	43 ₊₂₂
Social Condition	Material relationship to watershed	Fishability	84 ₊₃
Economic Condition	Community well- being	School lunch program enrollment	71 ₊₁₅
Hydrology/Geomorphology	Erosion	TSS Bed-load movement	34 ₊₈
Ecological Processes	Exotic invasion	Extent Rate of spread	57 ₊₃₁
Natural Disturbance	Fire	Spread risk Succession/regener- ation	35 ₊₁₆
Chemical/Physical Properties	Toxics	Metals Pesticides	52 ₊₉



2.1

Functioning
Great water quality
Aquatic habitat
Low threat invasive
weeds

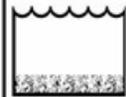
At Risk
Water quality
Road density
Soils
Forest Cover
Forest Health

Impaired
Aquatic biota
Riparian vegetation
Fire Effects

The Arroyo Seco Report Card

Goal	Indicators	Condition	Trend	Confidence
To sustainably manage local water supplies for human and natural communities.	Per Capita Water Use	94	Not Assessed	High
	Healthy Surface Waters	60	Not Assessed	Moderate
	Rain Reaching Groundwater	59	Not Assessed	Moderate
To have widespread community awareness and deep civic engagement in the protection and improvement of watersheds.	Local Government Action	44	Not Assessed	Moderate
	Presence of Native Wildlife	59	Not Assessed	Moderate
To conserve and restore a diversity of native habitats to support fish and wildlife.	Protected Native Habitats	60	Not Assessed	High
	Habitat Intactness	57	Not Assessed	High
	Storm Flow Pattern	55	Not Assessed	Moderate/High
To restore or simulate natural disturbance processes that balance benefits for human and natural communities.	Wildfire Pattern & Intensity	75	↔	High
	Aquatic Recreation	82	Not Assessed	Moderate
To meet human needs and enhance the quality of life by improving the conditions of watersheds and their ecosystems.	Vegetated Residential Area	83	Not Assessed	Moderate
	Equitable Park Access	55	Not Assessed	Moderate
	Overall Score:	65.25		



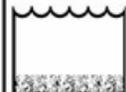
COLOR KEY:  GOOD  CONCERN  FAIR  POOR  N/A	AQUATIC LIFE						RECREATION		FISH EDIBILITY	
										
SEGMENT	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	CONCERN	N/A	N/A	N/A	N/A	CONCERN	N/A	N/A	N/A	POOR
to Winchendon WWTF	N/A	FAIR	N/A	POOR	N/A	CONCERN	N/A	CONCERN	CONCERN	POOR
to Otter River	GOOD	FAIR	FAIR	CONCERN	N/A	CONCERN	N/A	GOOD	GOOD	POOR
to South Royalston	GOOD	GOOD	FAIR	GOOD	POOR	GOOD	GOOD	N/A	GOOD	POOR
to Orange Center	CONCERN	FAIR	FAIR	GOOD	POOR	CONCERN	N/A	N/A	GOOD	POOR
to Erving WWTF	CONCERN	FAIR	N/A	GOOD	CONCERN	CONCERN	N/A	N/A	GOOD	POOR
to Connecticut River	GOOD	FAIR	FAIR	CONCERN	CONCERN	CONCERN	GOOD	N/A	CONCERN	POOR
OTTER RIVER										
to Gardner WWTF	FAIR	POOR	FAIR	N/A	N/A	N/A	GOOD	GOOD	CONCERN	POOR
to Seaman Paper Co.	FAIR	POOR	POOR	CONCERN	POOR	CONCERN	CONCERN	N/A	POOR	POOR
to Millers River	FAIR	FAIR	POOR	GOOD	POOR	CONCERN	GOOD	N/A	POOR	POOR
TULLY RIVER										
East Branch	CONCERN	FAIR	N/A	N/A	N/A	N/A	CONCERN	N/A	CONCERN	POOR
Boyce Brook	GOOD	FAIR	N/A	N/A	N/A	N/A	N/A	N/A	GOOD	POOR
West Branch	GOOD	GOOD	N/A	N/A	N/A	N/A	GOOD	N/A	GOOD	POOR
Lawrence Brook	GOOD	POOR	N/A	N/A	N/A	N/A	GOOD	N/A	GOOD	POOR
Main Stem	CONCERN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GOOD	POOR



SEGMENT	AQUATIC LIFE						RECREATION		FISH EDIBILITY	
	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	CONCERN	N/A	N/A	N/A	N/A	CONCERN	N/A	N/A	N/A	POOR
to Winchendon WWTF	N/A	FAIR	N/A	POOR	N/A	CONCERN	N/A	CONCERN	CONCERN	POOR
to Otter River	GOOD	FAIR	FAIR	CONCERN	N/A	CONCERN	N/A	GOOD	GOOD	POOR
to South Royalston	GOOD	FAIR	FAIR	GOOD	POOR	GOOD	GOOD	N/A	GOOD	POOR
to Orange Center										
to Erving WWTF										
to Connecticut River	GOOD	FAIR	FAIR	CONCERN	CONCERN	CONCERN	GOOD	N/A	CONCERN	POOR
OTTER RIVER										
to Gardner WWTF	FAIR	POOR	FAIR	N/A	N/A	N/A	GOOD	GOOD	CONCERN	POOR
to Seaman Paper Co.	FAIR	POOR	POOR	CONCERN	POOR	CONCERN	CONCERN	N/A	POOR	POOR
to Millers River	FAIR	FAIR	POOR	GOOD	POOR	CONCERN	GOOD	N/A	POOR	POOR
TULLY RIVER										
East Branch	CONCERN	FAIR	N/A	N/A	N/A	N/A	CONCERN	N/A	CONCERN	POOR
Boyce Brook	GOOD	FAIR	N/A	N/A	N/A	N/A	N/A	N/A	GOOD	POOR
West Branch	GOOD	GOOD	N/A	N/A	N/A	N/A	GOOD	N/A	GOOD	POOR
Lawrence Brook	GOOD	POOR	N/A	N/A	N/A	N/A	GOOD	N/A	GOOD	POOR
Main Stem	CONCERN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GOOD	POOR

Stream Segments and Locations



COLOR KEY:  GOOD  CONCERN  FAIR  POOR  N/A	AQUATIC LIFE						RECREATION	FISH EDIBILITY		
										
SEGMENT	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	CONCERN	N/A	N/A	N/A	N/A	CONCERN	N/A	N/A	N/A	POOR
to Winchendon WWTF	N/A	FAIR	N/A	POOR	N/A	CONCERN	N/A	CONCERN	CONCERN	POOR
to Otter River	GOOD	FAIR	FAIR	CONCERN	N/A	CONCERN	N/A	GOOD	GOOD	POOR
to South Royalston	GOOD	GOOD	FAIR	GOOD	POOR	GOOD	GOOD	N/A	GOOD	POOR
to Orange Center	CONCERN	Color Coding								
to Erving WWTF	CONCERN									
to Connecticut River	GOOD	FAIR	FAIR	CONCERN	CONCERN	CONCERN	GOOD	N/A	CONCERN	POOR
OTTER RIVER										
to Gardner WWTF	FAIR	POOR	FAIR	N/A	N/A	N/A	GOOD	GOOD	CONCERN	POOR
to Seaman Paper Co.	FAIR	POOR	POOR	CONCERN	POOR	CONCERN	CONCERN	N/A	POOR	POOR
to Millers River	FAIR	FAIR	POOR	GOOD	POOR	CONCERN	GOOD	N/A	POOR	POOR
TULLY RIVER										
East Branch	CONCERN	FAIR	N/A	N/A	N/A	N/A	CONCERN	N/A	CONCERN	POOR
Boyce Brook	GOOD	FAIR	N/A	N/A	N/A	N/A	N/A	N/A	GOOD	POOR
West Branch	GOOD	GOOD	N/A	N/A	N/A	N/A	GOOD	N/A	GOOD	POOR
Lawrence Brook	GOOD	POOR	N/A	N/A	N/A	N/A	GOOD	N/A	GOOD	POOR
Main Stem	CONCERN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	GOOD	POOR



SEGMENT	AQUATIC LIFE							RECREATION		FISH EDIBILITY
	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	CONCERN									POOR
to Winchendon WWTF		FAIR		POOR				CONCERN	CONCERN	POOR
to Otter River	GOOD	FAIR	FAIR	CONCERN				GOOD	GOOD	POOR
to South Royalston	GOOD	GOOD	FAIR	GOOD	POOR	GOOD	GOOD	GOOD	GOOD	POOR
to Orange Center	CONCERN	3 Core Beneficial Uses								
to Erving WWTF	CONCERN									
to Connecticut River	GOOD	FAIR	FAIR	CONCERN	CONCERN	CONCERN	GOOD		CONCERN	POOR
OTTER RIVER										
to Gardner WWTF	FAIR	POOR	FAIR				GOOD	GOOD	CONCERN	POOR
to Seaman Paper Co.	FAIR	POOR	POOR	CONCERN	POOR	CONCERN	CONCERN		POOR	POOR
to Millers River	FAIR	FAIR	POOR	GOOD	POOR	CONCERN	GOOD		POOR	POOR
TULLY RIVER										
East Branch	CONCERN	FAIR						CONCERN	CONCERN	POOR
Boyce Brook	GOOD	FAIR						GOOD	GOOD	POOR
West Branch	GOOD	GOOD					GOOD		GOOD	POOR
Lawrence Brook	GOOD	POOR					GOOD		GOOD	POOR
Main Stem	CONCERN								GOOD	POOR

3 Core Beneficial Uses



SEGMENT	AQUATIC LIFE						RECREATION		FISH EDIBILITY	
	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	CONCERN									POOR
to Winchendon WWTF		FAIR		POOR				CONCERN		POOR
to Otter River	GOOD	FAIR	FAIR	CONCERN				GOOD		POOR
to South Royalston	GOOD	FAIR	FAIR	GOOD	POOR	GOOD	GOOD	GOOD		POOR
to Orange Center	CONCERN	3 Response Indicators								
to Erving WWTF	CONCERN									
to Connecticut River	GOOD	FAIR	FAIR	CONCERN	CONCERN	CONCERN	GOOD		CONCERN	POOR
OTTER RIVER										
to Gardner WWTF	FAIR	POOR	FAIR				GOOD	GOOD	CONCERN	POOR
to Seaman Paper Co.	FAIR	POOR	POOR	CONCERN	POOR	CONCERN	CONCERN		POOR	POOR
to Millers River	FAIR	FAIR	POOR	GOOD	POOR	CONCERN	GOOD		POOR	POOR
TULLY RIVER										
East Branch	CONCERN	FAIR						CONCERN		POOR
Boyce Brook	GOOD	FAIR						GOOD		POOR
West Branch	GOOD	GOOD					GOOD			POOR
Lawrence Brook	GOOD	POOR					GOOD			POOR
Main Stem	CONCERN							GOOD		POOR

3 Response Indicators

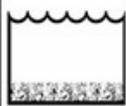


SEGMENT	AQUATIC LIFE							RECREATION	FISH EDIBILITY	
	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	CONCERN									POOR
to Winchendon WWTF		FAIR		POOR				CONCERN		POOR
to Otter River	GOOD	FAIR	FAIR	CONCERN		CONCERN		GOOD	GOOD	POOR
to South Royalston	GOOD	GOOD	GOOD	GOOD	POOR	GOOD	GOOD	GOOD	GOOD	POOR
to Orange Center	CONCERN							GOOD		POOR
to Erving WWTF	CONCERN							GOOD		POOR
to Connecticut River	GOOD	FAIR	FAIR	CONCERN	CONCERN	CONCERN	GOOD		CONCERN	POOR
OTTER RIVER										
to Gardner WWTF	FAIR	POOR	FAIR				GOOD	GOOD	CONCERN	POOR
to Seaman Paper Co.	FAIR	POOR	POOR	CONCERN	POOR	CONCERN	CONCERN		POOR	POOR
to Millers River	FAIR	FAIR	POOR	GOOD			GOOD		POOR	POOR
TULLY RIVER										
East Branch	CONCERN	FAIR					CONCERN		CONCERN	POOR
Boyce Brook	GOOD	FAIR							GOOD	POOR
West Branch	GOOD	GOOD					GOOD		GOOD	POOR
Lawrence Brook	GOOD	POOR					GOOD		GOOD	POOR
Main Stem	CONCERN								GOOD	POOR

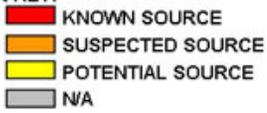
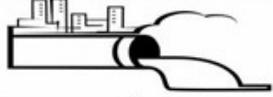
7 Additional Indicators



SEGMENT	AQUATIC LIFE						RECREATION		FISH EDIBILITY		
	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE	
MILLERS RIVER											
to Whitney pond	F					Q				Hg	
to Winchendon WWTF		pH		U		Q		B	C	Hg,PCB	
to Otter River		pH	P	U		Q				Hg, PCB	
to South Royalston			P		PCB					Hg,PCB	
to Orange Center	A,F	pH	P		PCB	Q				Hg, PCB	
to Erving WWTF	A,F	pH	P		PCB	Q				Hg, PCB	
to Connecticut River		pH	P	U	PCB	Q			C	Hg, PCB	
OTTER RIVER											
to Gardner WWTF	I,F	DO,pH,T	P						C	Hg, PCB	
to Seaman Paper Co.	I,F	DO,pH, T	P	U	Me	Q	S		C,D	Hg, PCB	
to Millers River	I,F	pH	P		PCB	Q			O,C,D	Hg, PCB	
TULLY RIVER											
East Branch	F	pH					S		G	Hg, PCB	
Boyce Brook		pH								Hg, PCB	
West Branch										Hg, PCB	
Lawrence Brook		pH								Hg,PCB	
Main Stem	F									Hg, PCB	
			Stressors								

COLOR KEY:  GOOD  CONCERN  FAIR  POOR  N/A	AQUATIC LIFE						RECREATION		FISH EDIBILITY	
	 BIOLOGY	 CHEMISTRY	 NUTRIENTS	 TOXICS	 SEDIMENTS	 FLOW	 HABITAT	 BACTERIA	 AESTHETICS	 FISH TISSUE
SEGMENT	BIOLOGY	CHEMISTRY	NUTRIENTS	TOXICS	SEDIMENTS	FLOW	HABITAT	BACTERIA	AESTHETICS	FISH TISSUE
MILLERS RIVER										
to Whitney pond	3					1				2
to Winchendon WWTF		4		4		4		1	1	2
to Otter River	3	3	3	1		4		1	2	2
to South Royalston	3	3	3	2	4	4	3		2	2
to Orange Center	4	2	2	4	2	2			2	2
to Erving WWTF	4	2	2	4	1	2			2	2
to Connecticut River	3	3	3	4	1	4	3		2	2
OTTER RIVER										
to Gardner WWTF	4	2	2				3	1	2	1
to Seaman Paper Co.	4	3	3	1	2	4	3		2	2
to Millers River	4	2	2	4	4	2	3		2	2
TULLY RIVER										
East Branch	4	1					3		2	1
Boyce Brook	3	1							2	1
West Branch	4	1					3		2	1
Lawrence Brook	4	1					3		2	1
Main Stem	3								2	1

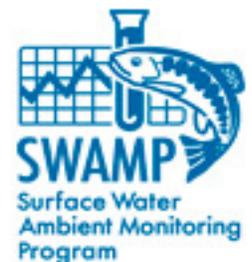
Metadata

COLOR KEY: 	POINT SOURCES		NON-POINT SOURCES						
									
SEGMENT	MUNICIPAL	INDUSTRIAL	STORM WATER	RESOURCE EXTRACT.	LAND DISPOSAL	SEDIMENT	HYDRO MODIFICA.	OTHER	UNKNOWN
MILLERS RIVER									
to Whitney Pond							WDL,IMP	ATM	
to Winchendon WWTF	CSO					SED*		ATM	
to Otter River	MTF				LDF	SED*		ATM	
to South Royalston						SED		ATM	
to Orange Center						SED	IMP,FLW	ATM	
to Erving WWTF						SED	IMP,FLW	ATM	
to Connecticut River					LDF	SED	FLW	ATM	
OTTER RIVER									
to Gardner WWTF			URB			SED*		ATM	
to Seaman Paper Co.	MTF,MS4		HWY	S&G		SED*		ATM	
to Millers River	MTF		HWY	S&G		SED		ATM	
TULLY RIVER									
East Branch					LDF	SED*	FLW	ATM	
Boyce Brook						SED*		ATM	
West Branch						SED*		ATM	
Lawrence Brook						SED*		ATM	
Main Stem								ATM	

Sources

MA Report Card System

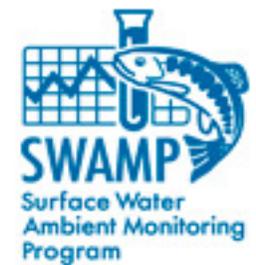
- Developed by Warren Kimball of the MA Department of Environmental Protection
- Automated by John Kiddon, Narragansett EPA
- It is currently used :
 - As a pilot project in central MA for stream monitoring
 - As a pilot project for New England's lake and pond monitoring (Lake Attitash)
 - As a pilot project in Oregon
 - As a pilot project in the San Diego region



“The River is the Report Card of the Watershed”



Produced by Lane Council of Governments



Next Steps

- Use collaborative approach with stakeholders
- Develop appropriate indicators, thresholds, and scoring with R3

