



MEASUREMENT OF WATER QUALITY

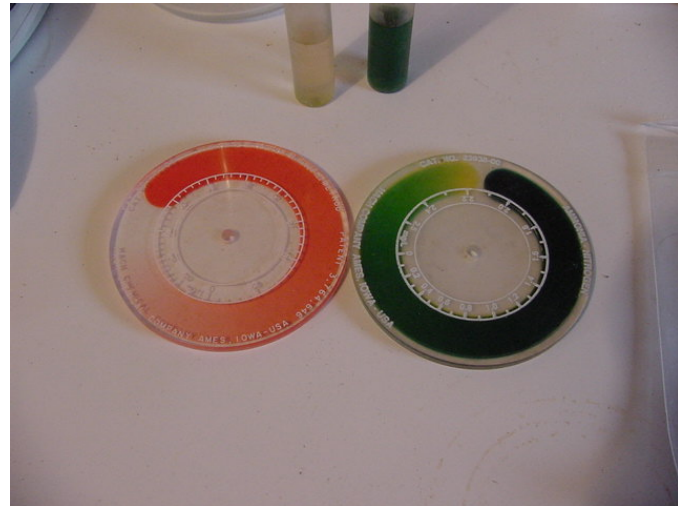
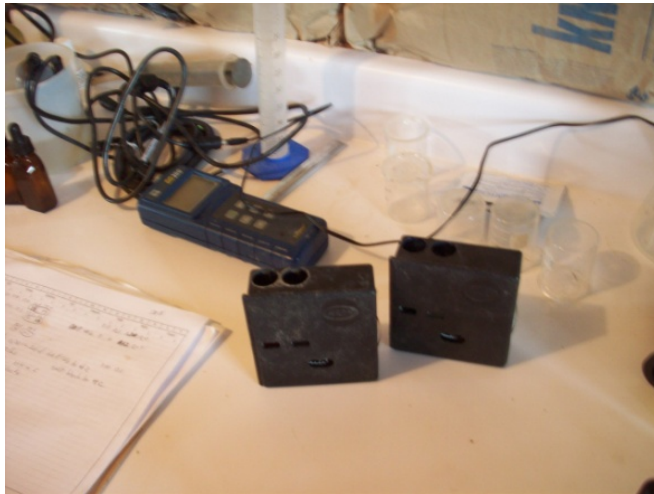
at

Aquaculture 101; Sustainable Seafood Production in the Midwest
MU Bradford Farms; July 11-12

D. E. Brune

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University of Missouri**

Water Quality Laboratory Supplies



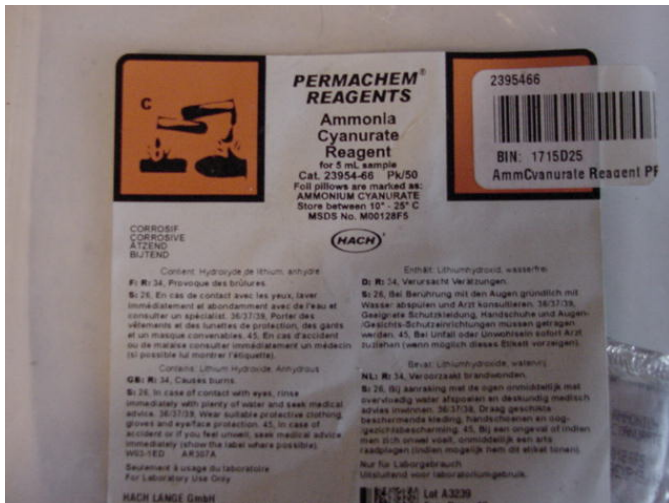
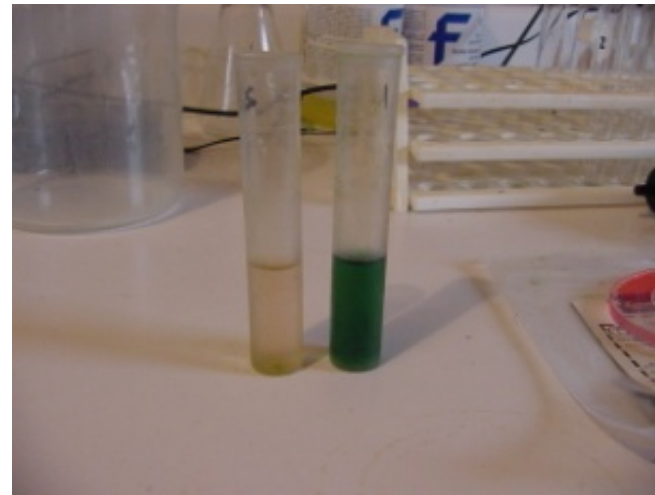
“Hach” fish-farmers kit, colorimetric wet chemistry
Requires clean lab area, distilled water

Dissolved Oxygen, Temperature, pH, and Conductivity



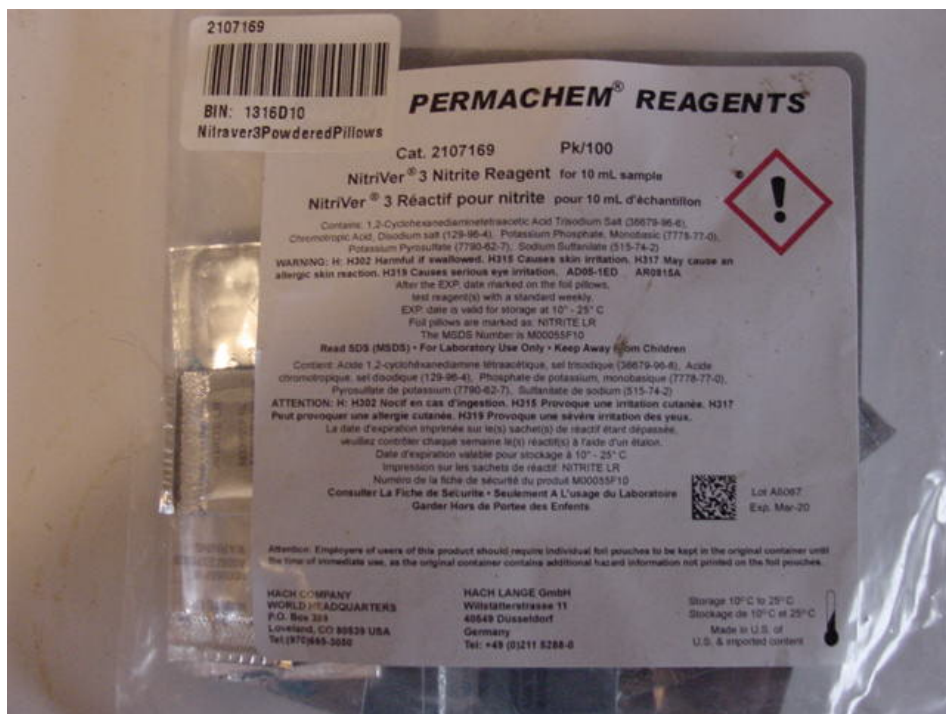
- “YSI” oxygen/temperature meter & “Pin-point” pH and salinity meters for in-situ determinations
- Aeration, emergency, supplemental O₂ supply

Total Ammonia Nitrogen (TAN)



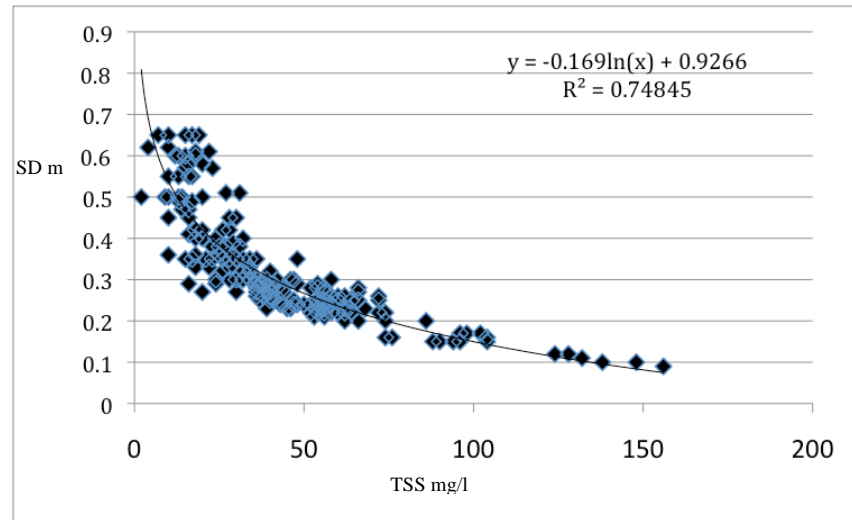
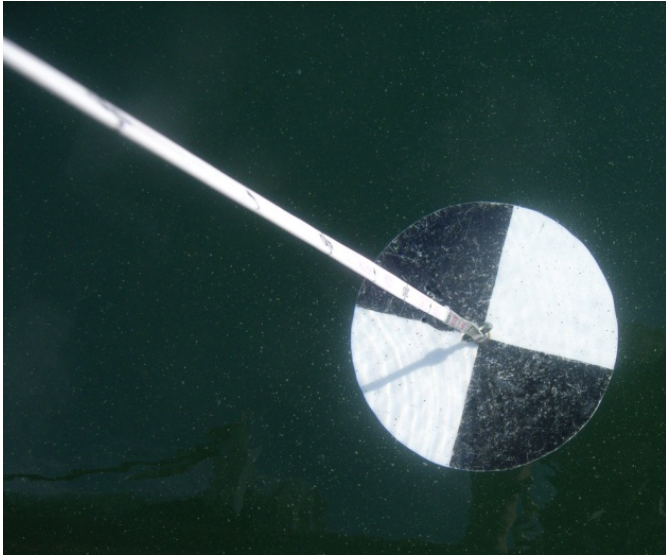
- Ammonia Salicylate and Ammonia Cyanurate powder reagents
- Record keeping

Nitrite ($\text{NO}_2\text{-N}$)



- “NitriVer” powder reagent
- Systematic procedures in adding reagents

Secchi Disk and Water Depth



Secchi Disk reading as measure of solids (algae or bacterial) concentration

Alkalinity



- Bromocresol green - methyl red indicator power
- 1.6 N acid titration to endpoint color change
- Sodium bicarbonate for alkalinity addition

Hardness



- Add Indicator solution
- Drop wise titration to color end-point, 17.12 x drops = mg/l as CaCO_3
- Measure of Calcium important for bone and shell formation
- Additions of lime or CaSO_4 as needed

Conductivity

- Salinity in marine systems
- Total dissolved solids in freshwater systems
- Sea salts (\$0.50/lb,) agricultural salts (\$0.05/lb)



envco

Conversion Table for Changing Conductivity into Salinity

Conductivity*						Salinity
0°C	5°C	10°C	15°C	20°C	25°C	ppt
1,200	1,400	1,500	1,700	2,000	2,200	2,400
2,200	2,500	2,600	3,300	3,700	4,100	4,500
3,200	3,700	4,200	4,700	5,300	5,900	6,500
4,100	4,700	5,400	6,100	6,900	7,800	8,400
5,000	5,800	6,600	7,500	8,400	9,300	10,300
5,900	6,800	7,900	8,900	9,900	11,000	12,100
6,700	7,800	8,900	10,100	11,300	12,600	13,900
7,600	8,800	10,100	11,400	12,800	14,300	15,700
8,500	9,800	11,200	12,700	14,200	15,800	17,400
9,300	10,800	12,300	13,900	15,600	17,300	19,100
10,200	11,800	13,400	15,200	17,000	18,900	20,800
11,000	12,800	14,500	16,500	18,900	20,900	22,500
11,900	13,700	15,600	17,600	19,700	21,900	24,100
12,800	14,600	16,500	18,500	21,100	23,400	25,600
13,400	15,500	17,400	19,400	22,400	24,900	27,100
14,200	16,400	18,400	21,200	23,800	26,400	28,600
15,000	17,400	19,400	22,400	25,100	27,900	30,100
15,800	18,300	20,400	23,400	26,400	29,400	31,600
16,600	19,200	21,400	24,400	27,700	30,900	33,100
17,400	20,100	22,400	25,400	29,000	32,400	34,600
18,200	21,000	23,400	26,400	30,300	33,900	36,100
19,000	21,900	24,400	27,400	31,600	35,400	37,600
19,800	22,800	25,400	28,400	32,900	36,900	39,100
20,600	23,700	26,400	29,400	34,200	38,400	40,600
21,400	24,600	27,400	30,400	35,500	39,900	42,100
22,200	25,500	28,400	31,400	36,800	41,400	43,600
23,000	26,400	29,400	32,400	38,100	42,900	45,100
23,800	27,300	30,400	33,400	39,400	44,400	46,600
24,600	28,200	31,400	34,400	40,700	45,900	48,100
25,400	29,100	32,400	35,400	42,000	47,400	49,600
26,200	30,000	33,400	36,400	43,300	48,900	51,100
27,000	30,900	34,400	37,400	44,600	50,400	52,600
27,800	31,800	35,400	38,400	45,900	51,900	54,100
28,600	32,700	36,400	39,400	47,200	53,400	55,600
29,400	33,600	37,400	40,400	48,500	54,900	57,100
30,200	34,500	38,400	41,400	49,800	56,400	58,600
31,000	35,400	39,400	42,400	51,100	57,900	60,100
31,800	36,300	40,400	43,400	52,400	59,400	61,600
32,600	37,200	41,400	44,400	53,700	60,900	63,100
33,400	38,100	42,400	45,400	55,000	62,400	64,600

Stocking animals



- 24-36 hrs holding/tempering tank adjustment to pH, temperature, salinity

Automated Feed Addition



- Belt feeders for continuous feed addition improves water quality

Organic additions



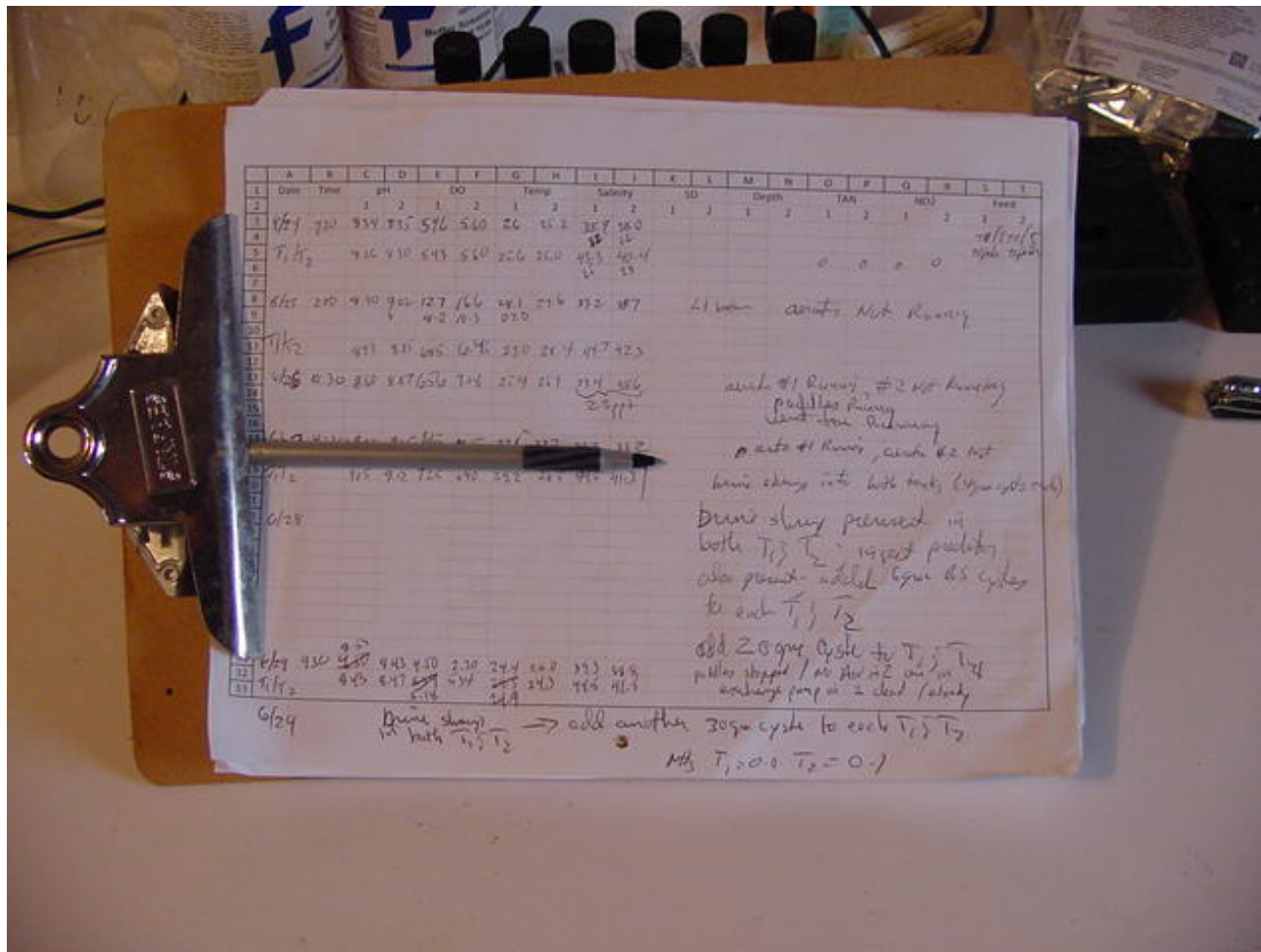
- Carbohydrate addition for water quality (nitrogen) control
- Increases solids levels (sludge production) & oxygen demand

Deep tanks for solids sedimentation in intensive systems



- Solids settling and treatment in closed systems
- Reduces system oxygen demand

Record keeping



- Essential to efficient animal grow-out
- Maximizing biogain and cash-flow