

***FROM COP TO COLLABORATOR:  
FACILITATING WASTEWATER NUTRIENT REMOVAL IN RURAL AMERICA***

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*13,000 communities have wastewater flows smaller than 1.0 MGD*

many being mechanical plants ...



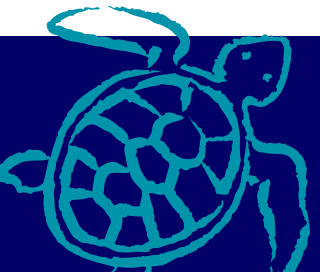
... most being lagoons

*Median wastewater flow rate is 300,000 GPD*

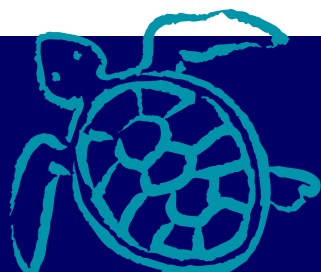


## *Optimizing existing plants: a good place to start*

Community	Flow (MGD)	Population	Cost	Nitrogen (mg/L)		Phosphorus (mg/L)	
				Before	After	Before	After
Chinook, Montana	0.065	1,250	\$10,000	25	3	2.5	1.0
Norris, Tennessee	0.100	1,650	\$7,500	20	5	4.0	4.0
Conrad, Montana	0.200	2,550	\$7,500	35	7	2.5	0.2
Upton, Massachusetts	0.217	7,800	\$2,500	22	4	0.2	0.1
Big Sky, Montana	0.315	2,300	\$10,000	20	5	1.0	1.0
Columbia Falls, Montana	0.420	5,250	\$5,000	10	6	1.0	0.3



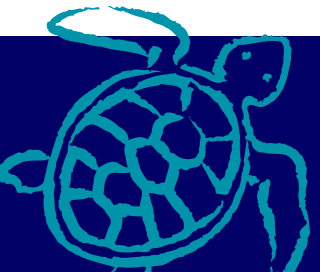
*Nutrient Removal for \$10,000 or less*



## *Optimizing Nitrogen & Phosphorus Removal in Mechanical Plants*

Change day-to-day operations to optimize nutrient removal

1. Training: Operator & Regulatory Staff
2. In-plant technical support (w/ Regulatory Staff)
3. Raise expectations: regulatory advocacy



*Grant's experience: most all wwtps can be made to remove N&P*



## *Can lagoons be made to remove nutrients?*

### **Option 1: Modify lagoon(s) to remove nutrients**

Is this technically viable for both short-term and long-term?

### **Option 2: Replace lagoon(s) with mechanical plant**

“Package plants” make this an affordable option.

Particularly, with remote process control.

### **Option 3: ??**

*Identify and support practical solutions*



## *Design Review & Approval: from cop to collaborator*

### Package Plants:

Do package plants need to comply with design standards?

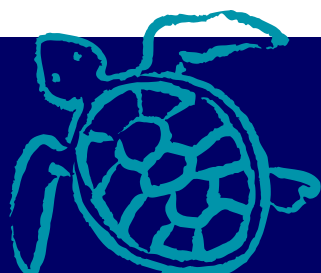
What level of engineering review do package plants with proven performance require?

Do small facilities need redundancy & everything required of big wwtps?

Is it necessary to require lagoons to be “closed” when replaced by new wwtps?



*Support affordable technologies*



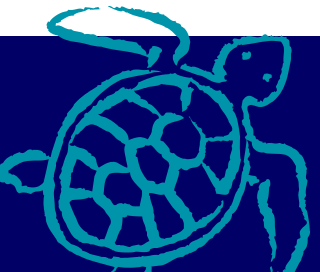
## *Permitting: from cop to collaborator*

Optimization schedules (vs. design & construct schedules)

Annual reporting on N&P efforts

Rolling average vs. monthly, daily maximum (acute vs. chronic)

“Punishing” good work by tightening limits



*Promote optimization efforts*



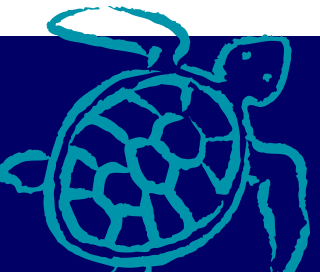
## *Plant Inspections & Permit Enforcement: from cop to collaborator*

Experienced pros vs. entry-level newbies

Permit compliance vs. excellence

Encourage non-compliance w/O&M Manuals

Technology transfer



*Empower excellence*





## *Operator Licensing & Plant Staffing: from cop to collaborator*

Given automation, what are real plant staffing needs?

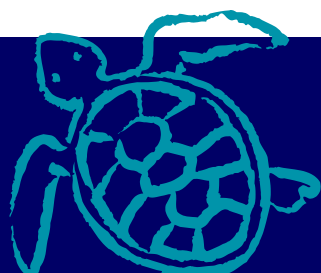
How do current licensing/staffing regs accommodate remote operations?

Besides ...

Most states are experiencing low license passing rates for operators.



*Enable off-site expertise*



## *Finance & Administration: from cop to collaborator*

1% of SRF Funds for training & technical support (vs. design & construct funds only)

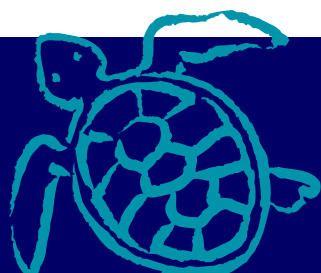
“Safe Harbor” letters

Excellence vs. permit compliance

Recognize & celebrate excellence



*Empower excellence by finding funds for practical solutions*



## Discussion

ID and revise policies & procedures

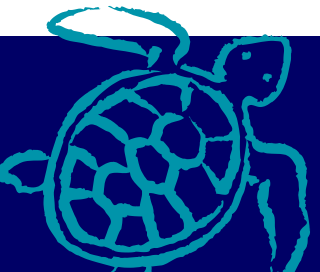
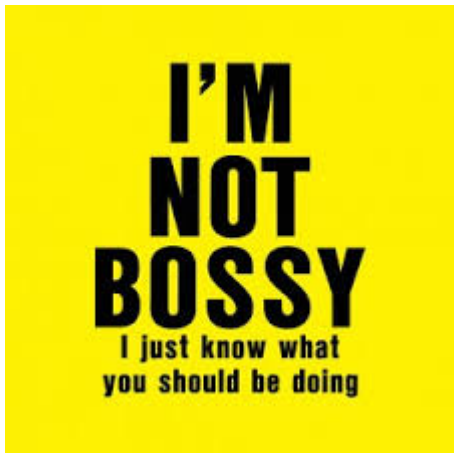
Design Review

Permitting

Plant Inspections

Licensing Operators

Funding Optimization Efforts



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