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Regional scale point source nutrient load estimation in support of SPARROW* modeling

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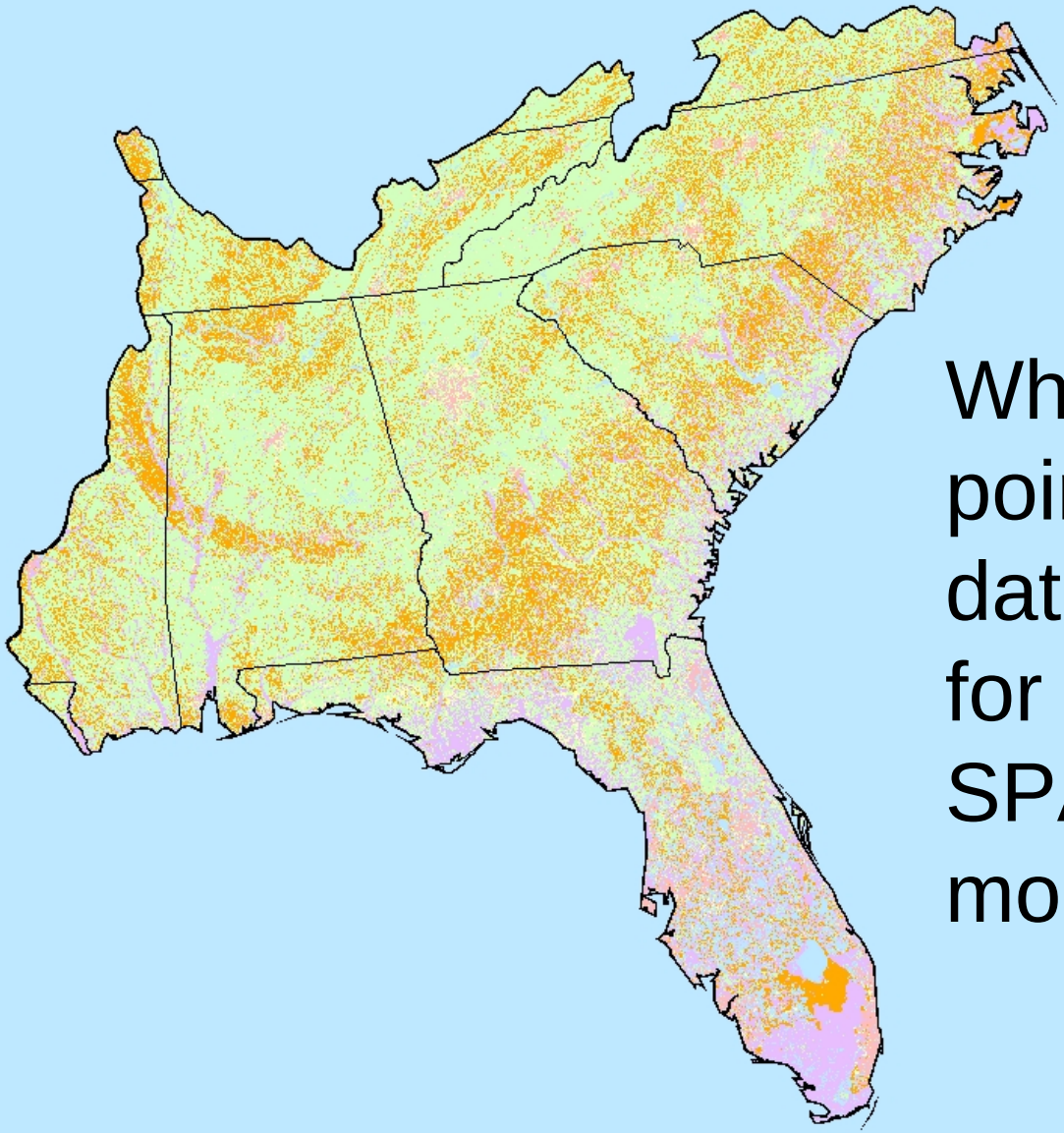
***SPA**tially **R**eferenced **R**egression **O**n **W**atershed Attributes

Summary of talk objectives

- How can PCS data be used to estimate annual, discharger-specific, point source nutrient loads across the southeastern United States?
- Summarize results of load estimation.
- Identify several take home messages about undertaking a similar project in the future.



What kinds of point source data are needed for the SPARROW model?

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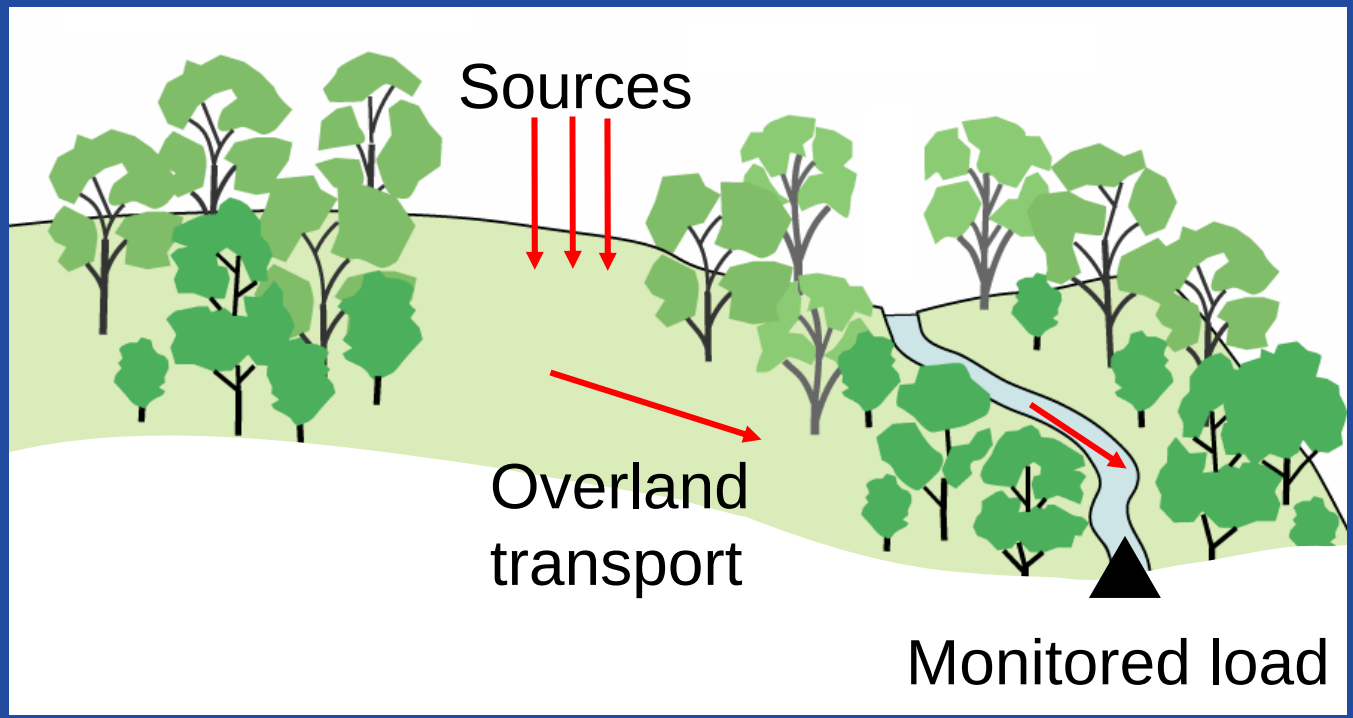
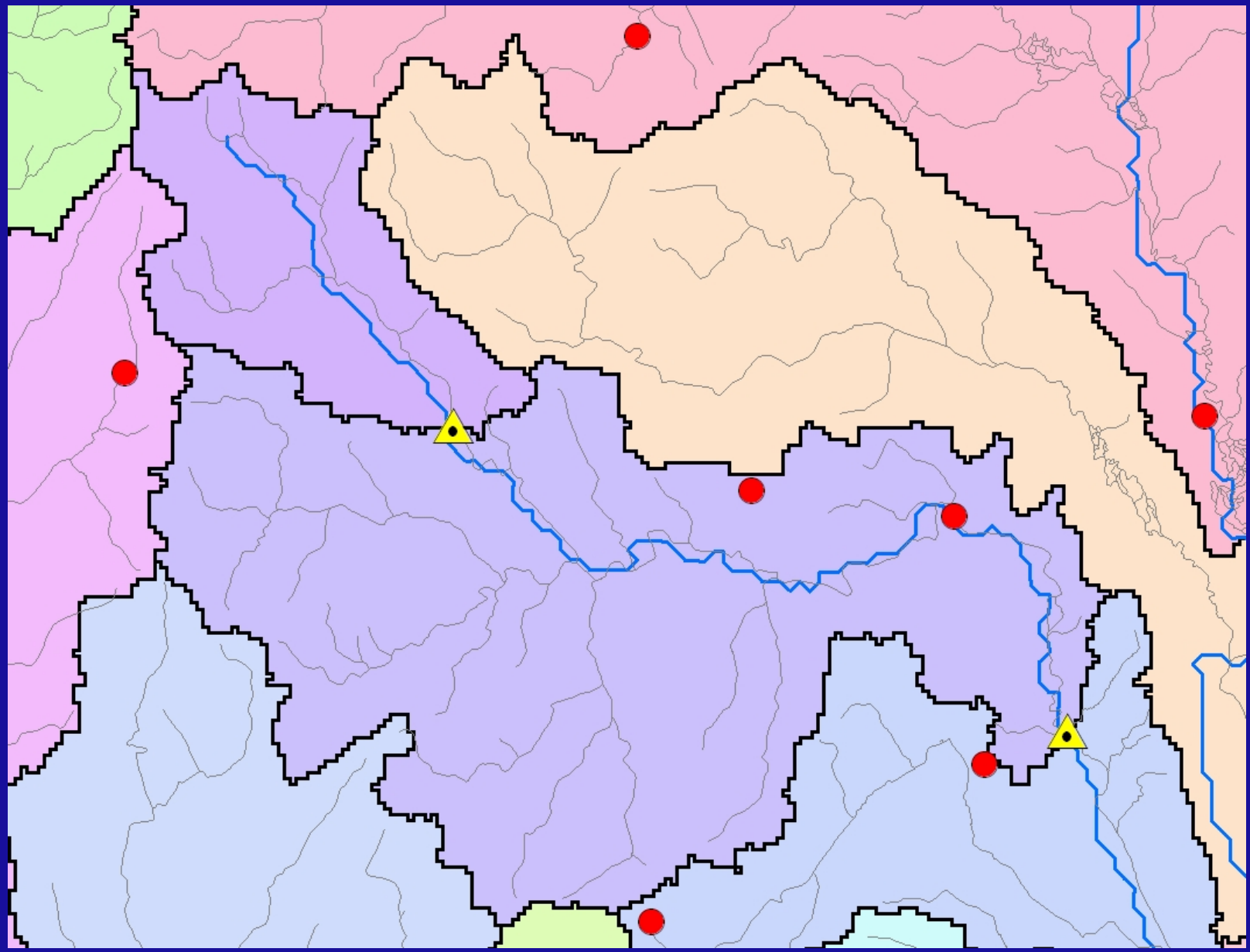
SPARROW model approach:
Regress monitored load against variables characterizing sources, overland transport and instream transport





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How can PCS data be used to estimate annual, discharger-specific nutrient loads across the southeastern United States?

- Data availability
- Methodology overview
- Data preparation
- Load calculation

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Where do we get data?

- How are point source discharge data generated?
- Decisions that focused the data development effort.
- How many dischargers?

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Methodology overview

- Overall concept similar to EPA Miss. R. point source nutrient load project (1998)
- 4-step load estimation process for southeastern U.S.

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Prepare data for load calculations

- Prepare single flow value.
- Prepare single TN and TP concentration value
  - Discharger specific
  - Typical pollutant concentration – SE region
  - Typical pollutant concentration – National

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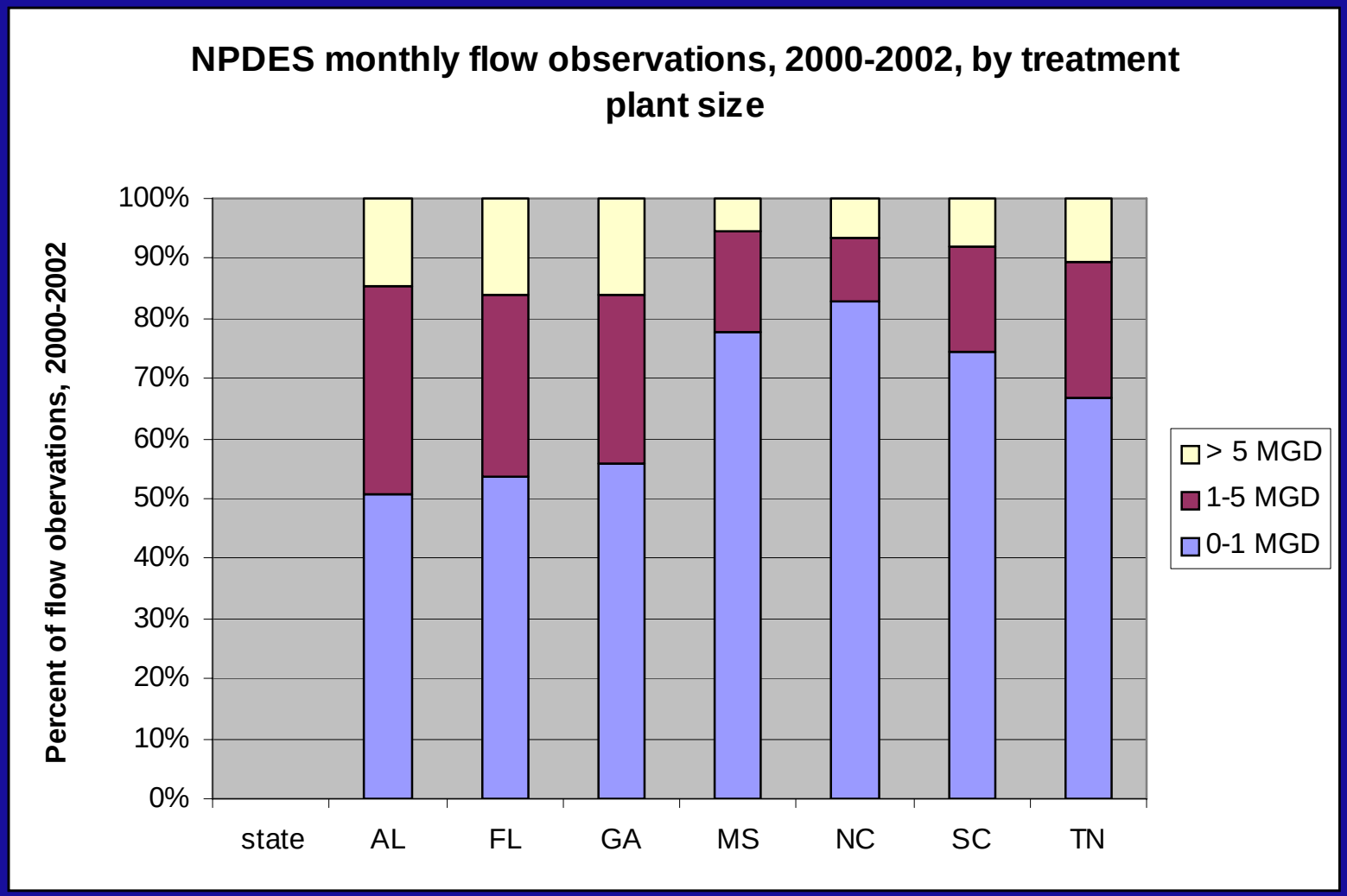
What is allocation of PCS/state flow data between major and minor dischargers?



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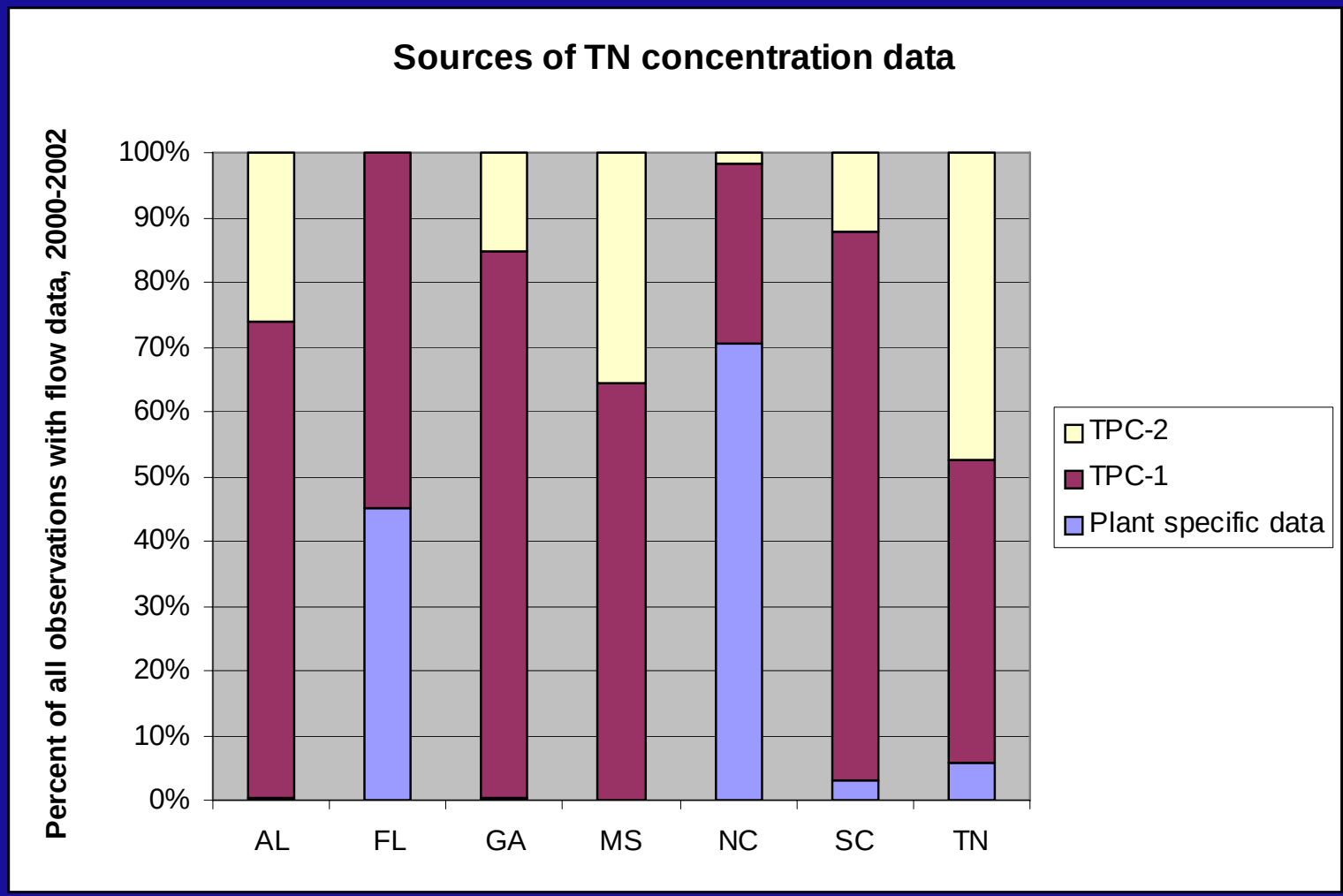
What are sources of NPDES TN and TP concentration data?



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Calculate loads

- **Load calculation approach**
- **Three load calculation scenarios**

1. **12-months of flow data**
2. **Flow data during 3 or 4 quarters, but less than 12 months.**
3. **Flow data during less than 3 quarters**

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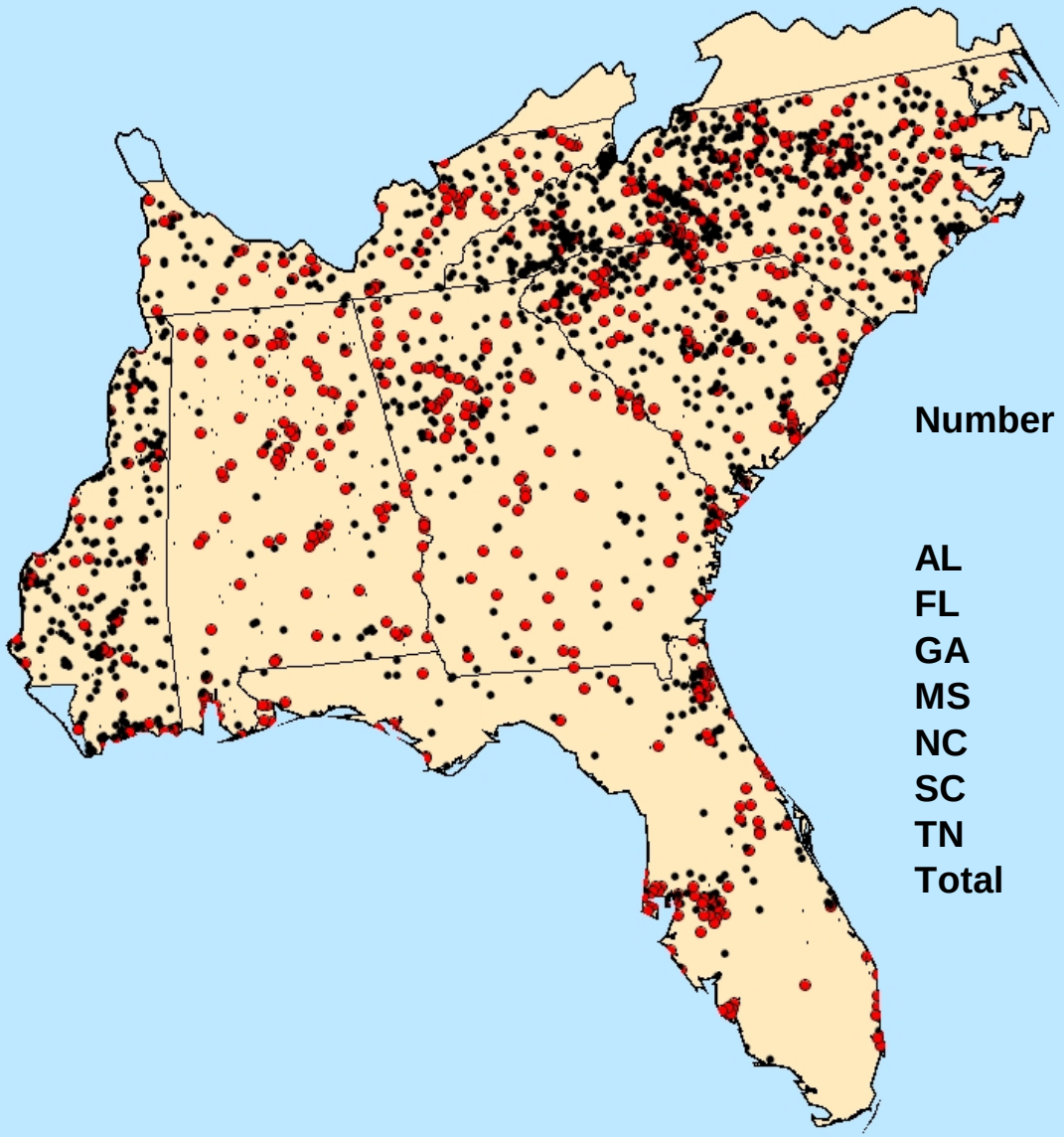

Number of dischargers, 2000

	Minor	Major	Total
AL	53	94	147
FL	137	106	243
GA	152	98	250
MS	467	64	531
NC	670	123	793
SC	224	84	308
TN	185	86	271
Total	1,888	655	2,543

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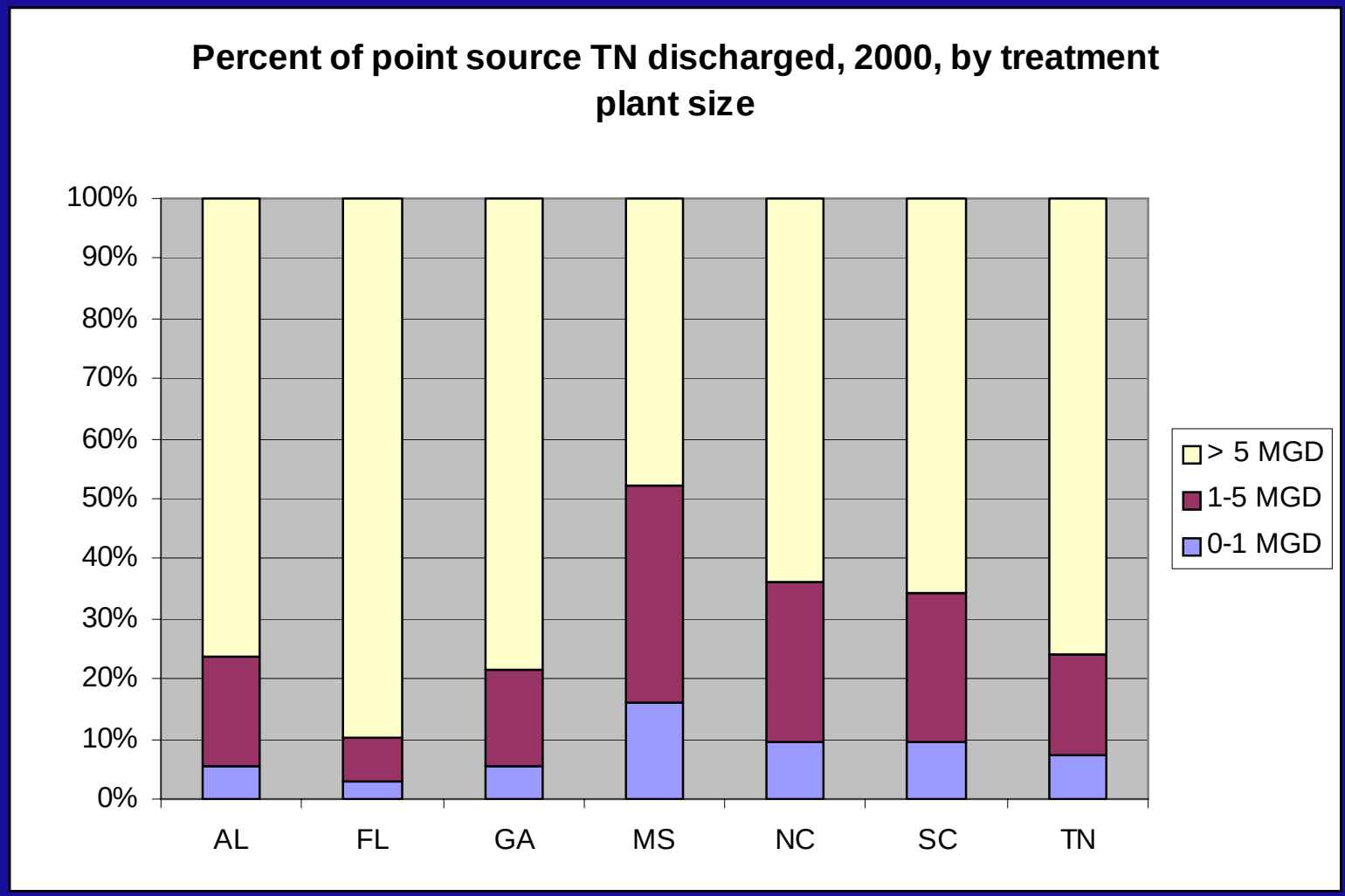
Dischargers with nutrient load, 2000

What is allocation of TN and TP load between major and minor dischargers?



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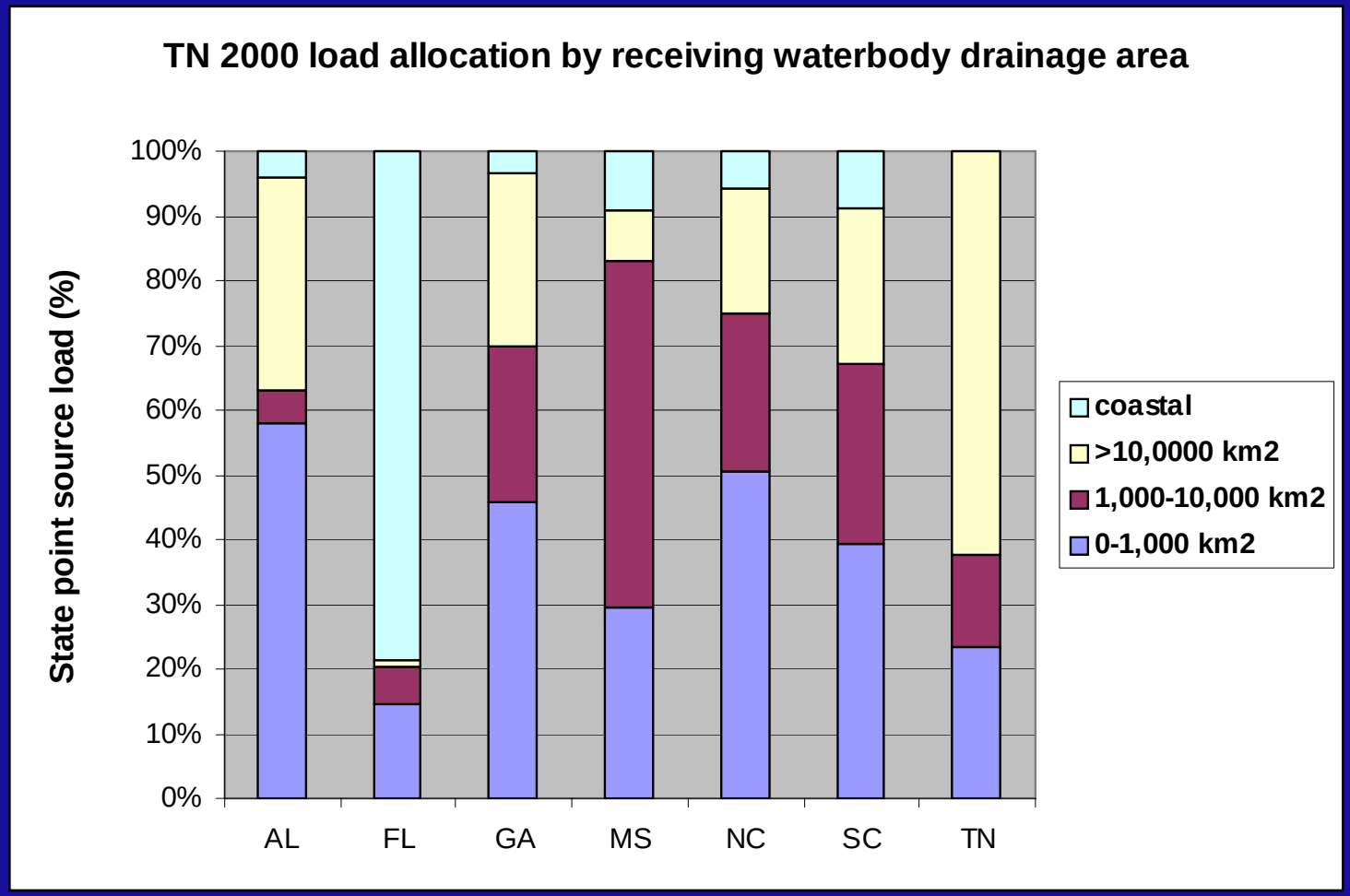
What is allocation of TN and TP load by size of receiving streams?



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What are the primary sources of TN and TP load, in terms of SIC code?

SIC	SIC description	TN
4952	Sewerage Systems	77%
2611	Pulp Mills	6%
2621	Paper Mills	5%
2631	Paperboard Mills	4%
2011	Meat Packing Plants	2%
2015	Poultry Slaughtering and Processing	1%
9711	National Security	1%
2869	Industrial Organic Chemicals,	1%
2874	Phosphatic Fertilizers	1%
2899	Chemicals and Chemical Preparations	0%

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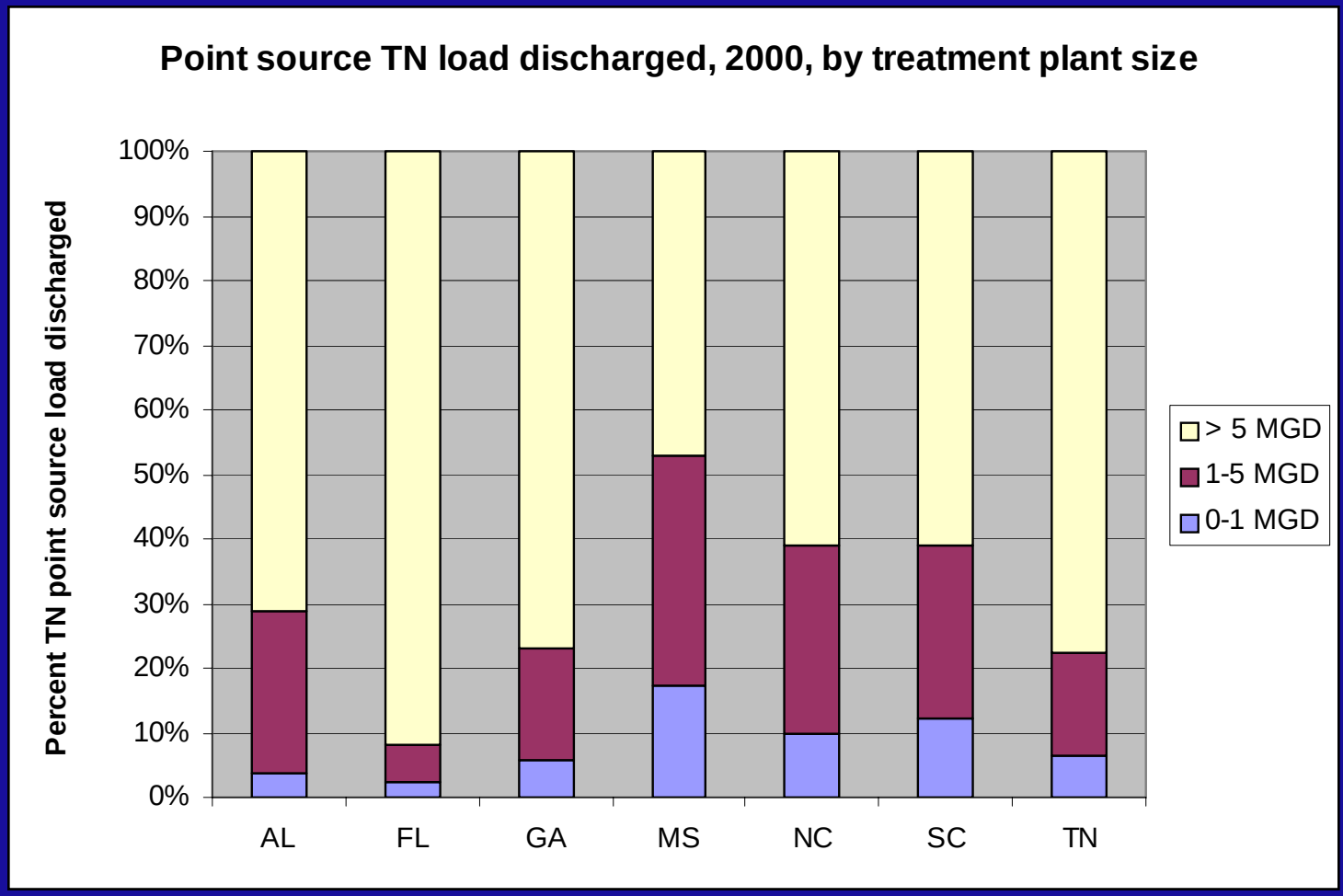
What is the allocation of TN and TP load from sewerage treatment plants by size of discharges?



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Conclusions

- Success in a census approach to calculating annual nutrient loads from point source dischargers across a large region is dependant on several factors.

- The load results to date highlight several lessons important to modelers.

- Need exists for long-term cooperative approach involving state and federal agencies to generate annual nutrient loads for the entire country using uniform procedures and assumptions.

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