



CONCEPT Emissions Model Status



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Outline

- Background
- Point / Area
- Nonroad Mobile
- Biogenics
- Onroad Mobile
- Speciation
- Spatial Processing

Open Emissions Model

- Regional Planning Organizations Fund Development 2/3 LADCO and 1/3 other RPO's
- Alpine Geophysics/Environ Development team
- QA Tool written by EIIP (CEP, AG)
 - Fall 2004
- Schedule: Version .14 released
 - We will call it Version 1.? When we think it is SIP ready.

Community Development Model

- Built with the community in mind:
 - Minimized alternate programming languages
 - PostgreSQL, PERL, GRASS for GIS.
- Extensive internal/external documentation
- Code is to be GPL so nobody owns it
- Promote the development of new model components by third parties
 - NH3 Model – Completed(UC Davis / UCR)
 - Electric utility day specific/temperature model
 - QA Tools and documentation should come from community (EIIP)

Point And Area Source Models

- Most similar to EMS or SMOKE.
- Use RPO Data Exchange Protocol
 - Base on NIF3.0 format
- Extensions for Spatial, Temporal
- Include Point and Area models with updated temporalization to fit NIF
- Eliminate the need to externally process temporal information before emissions modeling
- Forecasting Future years will compute strategy costs and interpolate/extrapolate growth/control.

Nonroad Model

- LADCO will be funding the inclusion of EPA's Nonroad model into CONCEPT.
- Calculate Standard Condition Emissions.
- Apply Temporal correction like area source model.
- Use Grid Specific, hour specific temperatures to calculate emissions. Separate Diurnal/non-diurnal and Gas/Diesel. Same methods as Nonroad.

Biogenics

- Biogenics based on BEIS 3.12
- Spatial processor will grid BELD3.
- New Modifications include early MEGAN modification.
- Late 2005 will include updated secondary organic speciation to match new CAMX/CMAQ chemistry.

Pending MEGAN Science

Model of Emissions of Gases and Aerosols from Nature

- $MEGAN\ ER = AEF * MEA * DEA * HEA1$
 - ER:net emission rate
 - AEF:annual emission factor
 - MEA monthly emission activity factor
 - DEA daily emission activity factor
 - HEA hourly emission activity factor.
- Update MEA with BELD3
- Split out Sesquiterpenes, Pinenes, ?

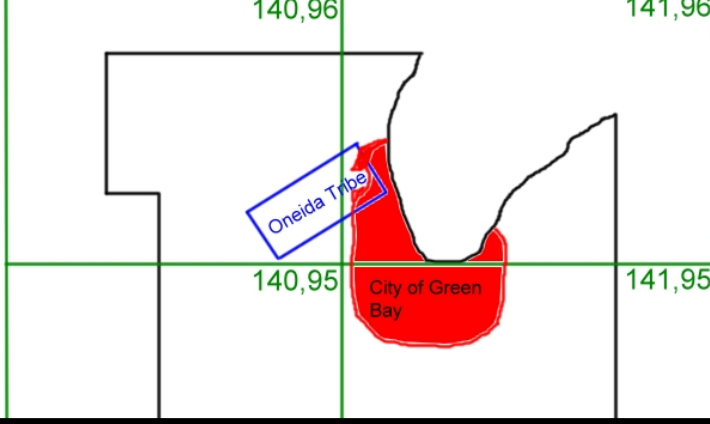
On Road Mobile Sources

- Mobile model based on Mobile6
- Built in T3 component to read directly from common Travel Demand Models
- Link based processing at high spatial resolution where needed
- Allows for Complex Temporal based on count base inventories. Mix/Speed/VMT
- Speed Correction of Link networks use same methods as TDM but with advanced temporal.
- Flexible Bins of Emissions factors to improve processing.
- Start/TAZ modeling improving.

Spatial Allocation

- Built on PROJ4 and other open source libraries(Not ARC/INFO)
- GIS has links to SQL so database is spatially enabled. That means that everything in the inventory is linked to it's spatial attributes.
 - Impact is that inventory is always viewable in a GIS. It is not a “special” activity but something you can just do as part of your QA.
- Tribal Spatial/Inventory processing core in the model. Tribes are discretely modeled

Tribal Inventory Incorporation



Obs	Country	State	County	Icell	Jcell	Sur.	Sur Ratio	Sur Value	AJ Country ID	AJ State/Cou nty	AJ Code
1	US	55	9	140	95	pop	.10	20000			
2a	US	55	9	140	96	pop	.11	22000			
2b	US	55	9	140	96	pop	.04	8000	US	00000	433
3	US	55	9	141	95	pop	.40	80000			
4a	US	55	9	141	96	pop	.33	66000			
4b	US	55	9	141	96	pop	.02	4000	US	00000	433

Spatial processing outside US

- 10 Digit Spatial ID that includes country, state/province, county/census division, and Jurisdiction/tribal codes.
- Other countries are not just wayward states of the US. (Canada ≠ US State ID 75)
- Model is truly global while also ready for high spatial resolution for sub county!

Community of Developers

- A community is not a common set of financial contributors
- Judge a community model by:
 - The number of community based improvements that make it into the public release
 - The frequency of updates/improvements.
 - The barriers an individual must cross before they get their work implemented.

Open Emissions Model – Systems Attributes

- Written In Postgres SQL
 - Publicly available, industrial strength database, SQL compliant, ACID compliant, client/server model, allows multiple concurrent sessions
- Built to run on LINUX (Redhat/Fedora)
- Binary Datasets not SAS/Fortran ASCII files which reduces I/O.

In CONCEPT and not currently in SMOKE and EMS

- Will read in NEIv3.0 format (IDA converter not required)
- Developed using PostgreSQL database
- Next Generation growth and control model will be an integral part of CONCEPT
- Simple Cost and interpolation model in Growth/Control
- 2 part spatial surrogate development tool integrated
- Excellent community driven QA tools
- Process based ammonia model
- **Build Lumped Speciation on the fly**
- EPA's NONROAD model will be built in CONCEPT
- Multiple processing engines for Mobile6
- Direct integration with travel demand models

Open Emissions Model

- ~~Regional Planning Organizations Fund Development~~
2/3 LADCO and 1/3 other RPO's
- Alpine Geophysics/UC Riverside/Environ Development team
- QA Tool written by EIIP (CEP, AG, ENVIRON?)
 - Fall 2004
- Schedule:
 - Beta Point/Area/Speciation July 1st 2004
 - Beta Biogenics/Spatial Allocation September 2004
 - Beta Mobile/Nonroad/ December 2004
 - Beta Ammonia December 2005
 - Final Draft of model April 1st 2005

Open Emissions Model - CONCEPT

- New Emissions model to replace EMS or SMOKE.
- Use RPO Data Exchange Protocol
 - Base on NIF3.0 format
 - Extensions for Spatial, Temporal, Link Networks
- Include Point and Area models with updated temporalization to fit NIF
- Speciation to handle SAPRC, CB-IV, HG and output to CAMX or CMAQ – No Fixed Species
- Growth and control will compute strategy costs and interpolate/extrapolate growth/control.

CONCEPT - On Road/Biogenics

- Mobile model based on Mobile6
 - Built in components to read directly from common Travel Demand Models
 - Link based processing at high spatial resolution where needed
- Biogenics based on BEIS 3.12
 - Will we add GLOBEIS Functionality?

Nonroad Model

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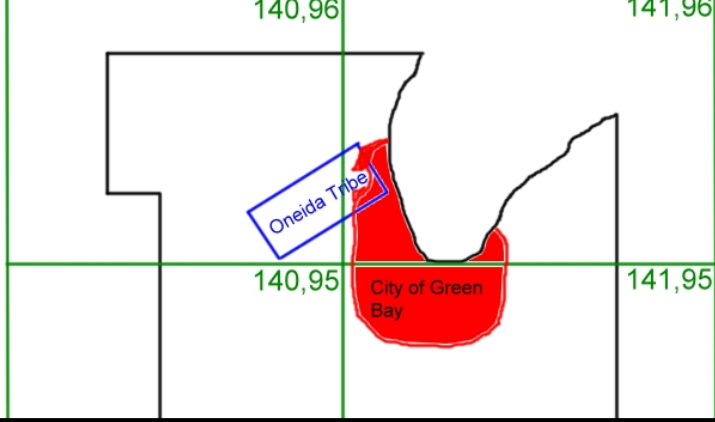
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Spatial Allocation

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- GRASS has links to SQL so access intermediate data sets can be tied back to geo-spatial data easily .

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6 Coolest Things in CONCEPT (Today)

- ACCESS to Postgress ODBC lets PC Users See what CONCEPT is using
- Qgis is an ARC/VIEW like program that lets you map all inventory components in an interactive map.
- Speed processor in mobile source model generates congested speeds by hour based on complex VMT profiles.
- Spatial processor makes surrogate generation for the typical user a realistic option.
- Tribal Processing. Just drop the emissions from TEISS in and let CONCEPT do the work of removing the state derived emissions for tribal lands and report what it took out.
- MEGAN Science will make SOA science better.