

Appendix U3

SANDAG Board of Directors Report: San Diego Forward: The Regional Plan Alternative Land Use Scenarios

Appendix U3 Contents

SANDAG Board of Directors Report: San Diego Forward:
The Regional Plan Alternatives Land Use Scenarios



**BOARD OF DIRECTORS
DECEMBER 6, 2013**

ACTION REQUESTED – DISCUSSION

**SAN DIEGO FORWARD: THE REGIONAL PLAN:
ALTERNATIVE LAND USE SCENARIOS**

File Number 3102000

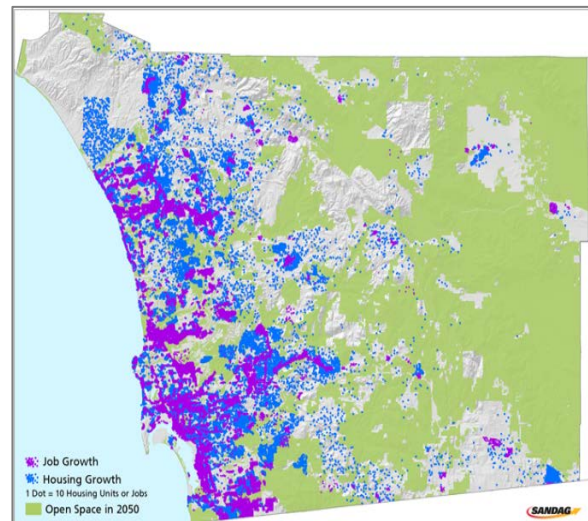
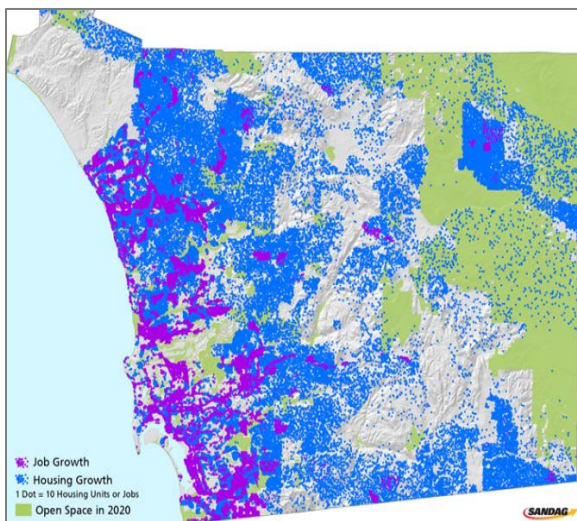
Introduction

On September 13, 2013, the Board of Directors discussed three land use scenarios that could be analyzed for their potential to further reduce greenhouse gas (GHG) emissions beyond what is projected in the Series 13 Regional Growth Forecast. The Regional Planning and Transportation Committees, various working groups, and the public provided input to help shape the scenarios. This work fulfills a commitment made by SANDAG when it adopted the 2050 Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS) to evaluate alternative land use scenarios to further reduce GHG. Staff is seeking input from the Board of Directors on the analysis, which will help inform San Diego Forward: The Regional Plan.

The region’s vision of its future has been evolving for decades. This evolution is illustrated in the figures below, which show the region’s projected housing and job growth based upon local general plans in 1999 (left) and 2013 (right). Over just 14 years, local plans have been updated to concentrate growth within the urbanized areas of the region, closer to existing and planned transportation infrastructure, while increasing land area dedicated to open space and habitat preservation. These land use changes implement the vision and goals set forth in the Regional Comprehensive Plan, adopted by SANDAG in 2004. These changes have resulted in an estimated reduction in GHG emissions of between 25 and 30 percent.

Projected housing and job growth – 1999
(Series 9 Regional Growth Forecast)

Projected housing and job growth – 2013
(Series 13 Regional Growth Forecast)



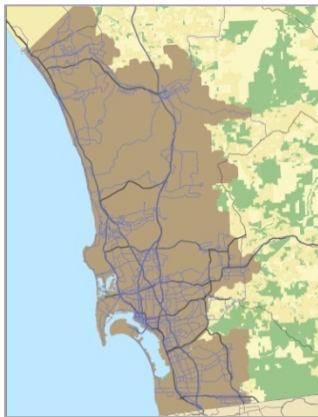
Alternative Scenarios

The three alternative scenarios discussed by the Board of Directors are described below, with more detailed assumptions provided in Attachment 1. While each is different, all scenarios use the Series 13 Regional Growth Forecast as the numeric baseⁱ; assume the same transportation networkⁱⁱ; include the same environmental constraintsⁱⁱⁱ; protect university, military, and institutional lands; and assume entitled development projects to 2020. In addition, all three scenarios allocate all future growth within the identified boundaries shown below in brown, and assume no future growth outside the boundaries, except for currently entitled projects. The scenarios were created as a planning exercise and do not reflect locally planned land uses.

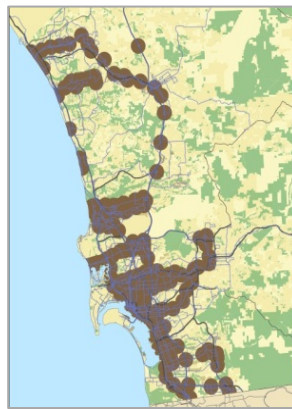
Scenario A: Second Units and Infill

Scenario B: Transit Oriented Development

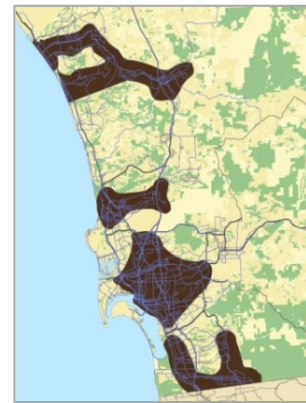
Scenario C: Multiple Dense Cores



Scenario A constrains future residential and employment growth to the west of the incorporated cities boundaries, and tests the impact of second units.



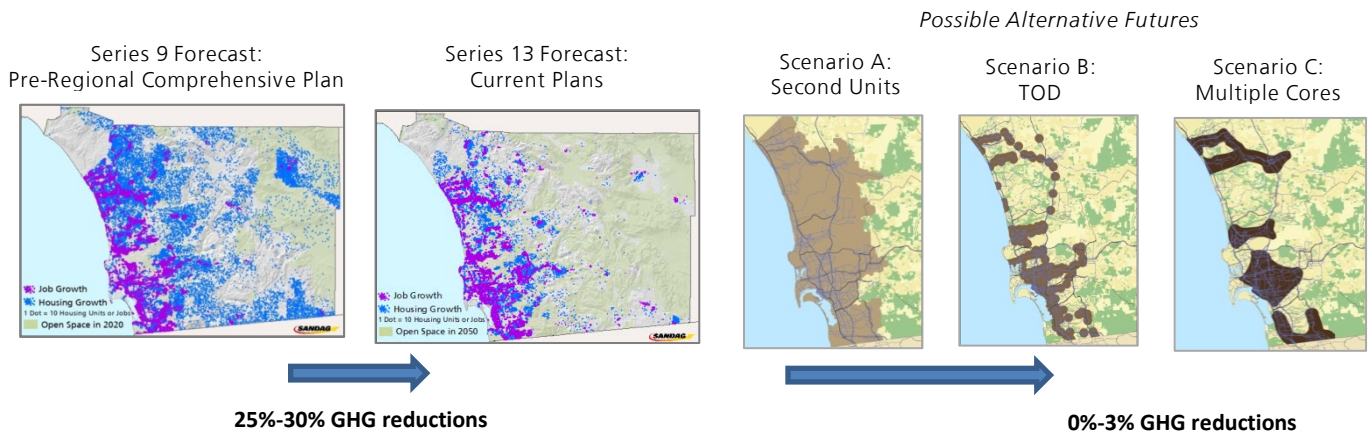
Scenario B concentrates new housing and jobs around existing and future transit stations included in the 2050 RTP/SCS. New development consists primarily of urban/compact development.



Scenario C focuses future growth into four dense cores. New housing and jobs consist of urban/compact development concentrated in North County; Mid-County; the greater Downtown area; and South County / International Border.

Greenhouse Gas Emissions Analysis

The initial analysis indicates that projected GHG emissions decrease most significantly between the Series 9 and Series 13 Regional Growth Forecasts (between 25 and 30 percent). GHG emissions have the potential to continue to decrease in comparison to Series 13 under the three scenarios, although at a slower pace (up to an additional 3 percent). Scenarios B and C are projected to achieve the greatest reductions.



This analysis has been conducted with a sketch modeling tool (known as “UrbanFootprint”), which is in use by several regional agencies throughout California. This tool requires less effort than the more complex transportation models and is intended to give indications or a “sketch” of the results. The “UrbanFootprint” sketch modeling tool allows us to more quickly run and compare scenarios based on several indicators, including GHG reductions. This tool could eventually be used by jurisdictions for local planning efforts, which if adopted, could be incorporated into future regional forecasts.

Similar to other planning tools, the assumptions used as inputs affect the resulting outcomes. Of particular note, since the three land use scenarios were evaluated, additional collaborative work has been undertaken across the state to develop consistent vehicle operating cost and other assumptions to be incorporated into the more complex transportation models that are used in the RTPs. Therefore, it is important to recognize that these initial GHG results produced through the sketch planning tool may vary from future model results that will be reported using the more complex land use and transportation models in San Diego Forward: The Regional Plan.

Concurrent with the scenario planning effort, SANDAG has been developing the Series 13 Regional Growth Forecast through the horizon year of 2050. In October, the Board accepted Series 13 for planning purposes for San Diego Forward: The Regional Plan and related planning efforts. The forecast is a separate and independent effort from the scenarios.

Discussion and Next Steps

Staff is seeking input from the Board of Directors on the land use scenario results and how the results may help shape a refined vision for the region’s future growth and development. The Board’s discussions and policy direction concerning the scenarios described in this report could influence the vision contained in San Diego Forward: The Regional Plan. Over time, land use plans are expected to continue to change as they have over the past 14 years. Local general and specific plan updates have collectively moved the region toward more compact development patterns, resulting in fewer projected GHG emissions. Similar actions in the future may move the region further in this direction. Board discussion is requested on the scenario results and on ideas for how the scenario results could be considered in San Diego Forward: The Regional Plan and combined with future innovations in technology.

GARY L. GALLEGOS
Executive Director

Attachment: 1. UrbanFootprint Scenario Development Method for SANDAG Alternative Land Use Scenarios, Prepared by Calthorpe Associates November 15, 2013

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- ⁱ Future growth consists of approximately 333,000 new homes; 490,000 new jobs; and 975,000 more people between 2012 and 2050.
 - ⁱⁱ Transportation network consists of the currently adopted 2050 RTP/SCS revenue constrained network.
 - ⁱⁱⁱ Environmentally constrained lands include parks, open space, protected lands, conserved habitat, and steep slopes.

UrbanFootprint Scenario Development Assumptions for SANDAG Alternative Land Use Scenarios ⁱ

Prepared by Calthorpe Associates | November 22, 2013

The SANDAG alternative land use scenario development process explores alternative land use distributions to the Series 13 Regional Growth Forecast. Series 13 provides an updated base year (2012) environment for the San Diego region, and projects the region's population, housing, and employment to 2050. Three land use alternatives, along with high-level assumptions, were outlined by the SANDAG Board of Directors, Policy Advisory Committee members, working group members, and the public. These alternatives (Scenarios A, B, and C) were then built by Calthorpe Associates using the 'UrbanFootprint' sketch modeling tool. For comparison purposes, Calthorpe Associates also 'translated' the Series 13 Forecast data into UrbanFootprint, and integrated a past-trend scenario based on the SANDAG Series 9 Forecast (1999) into the sketch modeling framework.

All scenarios are built upon a base year of 2012, with a horizon year of 2050. Each scenario accommodates the entire Series 13 Forecast to 2050, which consists of a growth increment of approximately 333,000 new housing units, 490,000 new jobs, and 975,000 new people. The year-2012 UrbanFootprint base data 'canvas,' the layer upon which all future growth or change is applied, was developed in close coordination with SANDAG staff based on the detailed parcel and related data of the Series 13 2012 base year datasets. In addition to these common forecast-level characteristics, the three alternative land use scenarios assumed the following constants:

- Used the same transportation network (the revenue constrained transportation network from the 2050 Regional Transportation Plan/Sustainable Communities Strategy [2050 RTP/SCS]);
- Included the same environmental constraints consistent with those depicted in the 2050 RTP/SCS, including parks, open space, protected lands, conserved lands, and steep slopes;
- Protected existing and planned university, military, and institutional lands, such as health care facilities and schools. Attributes¹ from the Series 13 2050 Master Geographic Reference Areas (MGRAs)² with Institutional/University/Military uses were passed directly into the respective MGRAs for all scenarios; and,
- Assumed the construction of development projects that are entitled for development between now and 2020. All MGRAs were passed attributes from the entitlement areas dataset if they were designated as having projects with plans that have already been approved ("Entitlement Area").

¹ Attributes consist of detailed information maintained by SANDAG on dwelling units, employment and land use (by type) for base and forecast years in its Geographic Information System (GIS).

² Master Geographic Reference Areas (MGRAs) are geographic units roughly the size of a city block developed and maintained by SANDAG to support demographic modeling and forecasting.

Regional housing and employment distributions were controlled to four regional zones identified by SANDAG (shown in Figure 1). The residential and employment growth totals projected for each zone according to the Series 13 Forecast were maintained in each of the alternative land use scenarios, with the restriction that growth occur within specified scenario boundaries within each zone. Table 1 details the Series 13 dwelling unit and employment distribution into the four regional zones.

Figure 1: SANDAG Regional Zones

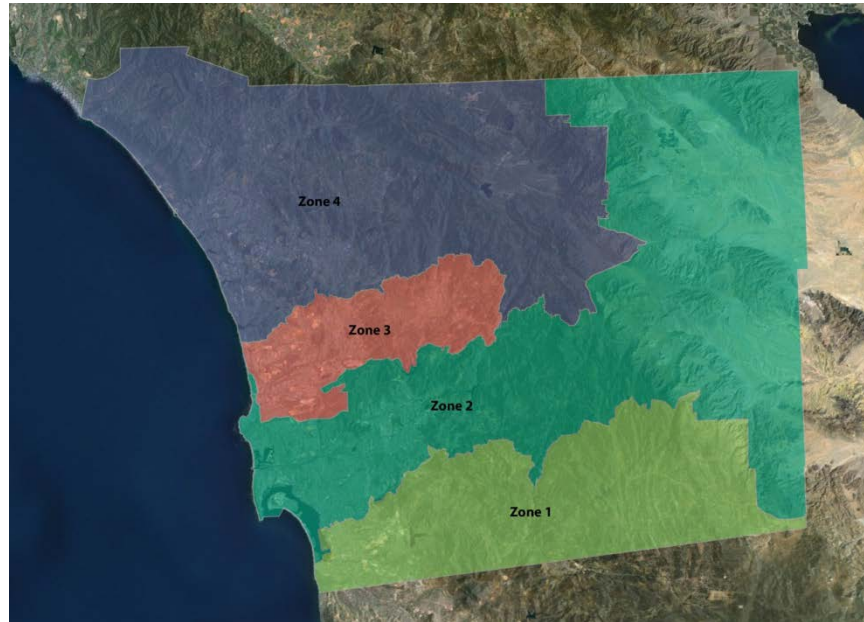


Table 1: Series 13 Net Increment Growth by Zone

Zone	Dwelling units*		Employment*	
	Number	Percent	Number	Percent
1	53,502	16%	88,441	19%
2	181,717	56%	187,536	40%
3	28,421	9%	89,432	19%
4	62,180	19%	103,104	22%
Total	325,819		468,513	

Varies from series 13 forecast increment due to specific unit type or employment type losses for some types in some zones over the 38-year forecast period (2012-2050).

Each of the land use alternatives was modeled to gauge its relative impacts on scenario performance metrics, including land consumption, passenger vehicle travel, greenhouse gas emissions, energy and water use, and local infrastructure costs. Modeling assumptions were developed by Calthorpe Associates in consultation with SANDAG staff and regional experts in relevant subject areas. As described in the following sections, each scenario varies in its growth boundaries, allocation of growth around high-quality transit nodes, integration of walkable street patterns, allocation of accessory units to existing single family parcels, and degree of growth focused within the defined Smart Growth Opportunity Areas (SGOAs) of the Smart Growth Concept Map. In all cases, scenario land uses were

translated or built using the library of UrbanFootprint Place Types, which depict a full spectrum of development options ranging from the most urban mixed use conditions to more suburban and rural single-use residential and employment patterns. In the case of SGOAs, Place Types allocated to specific SGOA areas were applied based on a ‘crosswalk’ between the SGOAs and UrbanFootprint Place Types, as laid out in Table 2.

Table 2: Smart Growth Opportunity Area to Place Type Crosswalk

SANDAG SGOA Type	Primary Focus Type	UrbanFootprint Place Type
Urban Center	Residential	City Residential
Urban Center	Commercial	City Commercial
Urban Center	Mixed	City Mixed Use
Town Center	Residential	Town Residential
Town Center	Commercial	Town Commercial
Town Center	Mixed	Town Mixed Use
Community Center	Residential	Village Residential
Community Center	Commercial	Village Commercial
Community Center	Mixed	Village Mixed Use
Transit Corridor	Residential	Town Residential
Transit Corridor	Commercial	Town Commercial
Transit Corridor	Mixed	Town Mixed Use

In consultation with SANDAG staff, a series of scenario development ‘rules’ was developed to reflect different growth concepts, forming the basis of where and in what form growth would be allocated in each scenario. Scenarios were built in UrbanFootprint using the rules to establish spatial and quantitative distributions of land uses in terms of UrbanFootprint Place Types. The specific rules for each scenario are detailed in the following sections.

Scenario A: Second Units and Infill/Redevelopment in Urban and Suburban Areas

The focus of Scenario A is to constrain future residential and employment growth to the boundaries of existing incorporated jurisdictions (and within the unincorporated “islands” inside the incorporated city boundaries), and to test the impact of a focused distribution of second units to specified single family parcels (also known as accessory units or granny flats). This required that all Series 13 growth projected in the unincorporated areas outside of existing incorporated jurisdictional boundaries be reallocated to the Scenario A zone. The majority of accessory unit additions were focused within two miles of fixed-route transit

Figure 2: Scenario A Boundary



stops, and the reallocation of other dwelling units and employment focused on SGOAs and the MGRAs within one mile of existing/planned fixed-route transit stops included in the 2050 RTP/SCS (including commuter rail, light rail, and bus rapid transit (BRT) stops). In addition to the common rules applied to all scenarios, Scenario A was built to meet the rules detailed as follows:

- **Growth constrained by the Scenario A boundary.** All new residential and employment growth fell within the Scenario A boundary as seen in Figure 2, except for Entitlement Areas and specified Institutional/University/Military zones from the Series 13 dataset.
- **Allocation of Series 13 2050 attributes within the Scenario A boundary.** To form the baseline scenario land use distribution, the first pass allocated Series 13 2050 attributes to all MGRAs within the Scenario A boundary.
- **Allocation of accessory units.** Parcels with a minimum size of 7,000 square feet and containing a single dwelling unit were identified as candidates for accessory units. Using the proportional zonal distribution of new single family units in the Series 13 2050 dataset, accessory units and their associated UrbanFootprint attributes (such as parcel acres and building square feet) were assigned to candidate parcels and loaded into the MGRA geography. The first pass of allocating accessory units placed 90 percent of the approximately 26,000 accessory units on candidate parcels within two miles of a high-quality/fixed route transit stop. The remaining 10 percent of units were assigned to candidate parcels outside of the two-mile buffer from transit stops.
- **Allocation of all remaining growth within Scenario A boundary using scenario rules.** The remaining growth from the Series 13 2050 dataset that fell outside of the Scenario A boundary, and was not single family or within an Institutional/University/Military area, was allocated within the Scenario A boundary. The rules allocated these remaining multi-family or attached housing units and jobs with a focus on SGOAs, transit proximity, and planned industrial areas (for industrial jobs). Additionally, these units were allocated so that total dwelling units, and total employment, including total retail, total office, and total industrial employment, were distributed across the four regional zones to match the distributions of the Series 13 2050 scenario.
- **All new growth avoided ‘constrained land’.** All parcels classified as constrained, which includes parks, open space, protected lands, conserved lands, and steep slopes, were not allowed to take new growth.
- **Allocation of base-year attributes to all no-change areas.** All remaining MGRAs that did not receive any new growth were passed attributes from the scenario base year (2012), as depicted in the UrbanFootprint base ‘canvas’ upon which all future growth or change is applied.

Figure 3: Scenario B Boundary

Scenario B: Transit Oriented Development

Scenario B was a highly constrained scenario that required that all new growth be focused within one mile of a high-quality/fixed route transit stop. To allocate a land use pattern to meet regional and zonal distributions of dwelling units and employment by type, Scenario B had a high proportion of “refill development” (infill and redevelopment) and urban/ compact development. A detailed list of rules used to construct Scenario B follows:



- **Growth constrained by the Scenario B boundary.** All new residential and employment growth fell within the Scenario B boundary (one mile from high quality, fixed-route transit stops), except for Entitlement Areas and specified Institutional/University/Military zones from the Series 13 2050 dataset.
- **Allocation of units to SGOA MGRAs.** Growth was allocated to SGOA geographies within the Scenario B boundary. Place types were assigned based on the type of SGOA and a base-year assessment of whether a given MGRA had a residential, commercial, or mixed-use focus.
- **Allocation of units to transit proximate locations.** The next pass allocated units to transit-proximate locations using the base-year assessment of a given MGRA’s primary focus type and its proximity to transit within the Scenario B boundary. The intensity of new growth was determined by the quantity of dwelling units and employment to meet the zonal distributions of the Series 13 2050 scenario.
- **Allocation of industrial units to planned industrial MGRAs within the Scenario B boundary.** To meet the zonal distributions of industrial employment, industrial-focused Place Types were assigned to MGRAs within the Scenario B boundary that contained planned industrial land uses from the Series 13 2050 dataset.
- **All new growth avoided redevelopment of single family dwelling unit parcels.** A parcel-level analysis was used to identify which parcels fell within urban, greenfield, or constrained lands based on the UrbanFootprint landtype dataset. Single family parcels that fell within Scenario B boundaries, and were not specifically identified by SANDAG as being likely to redevelop or intensify in the Series 13 Forecast, were not allowed to take new growth or be redeveloped.
- **All new growth avoided ‘constrained land’.** All parcels classified as constrained, which includes parks, open space, protected lands, conserved lands and steep slopes, were not allowed to take new growth.
- **Allocation of base-year attributes to all no-change areas.** All remaining MGRAs that did not receive any new growth were passed attributes from the scenario base year (2012), as depicted in the UrbanFootprint base ‘canvas’ upon which all future growth or change is applied.

Scenario C: Multiple Dense Cores

Scenario C was governed by a similar set of rules to Scenario B, but utilized a modified scenario boundary that focused growth within four existing urbanized areas in the SANDAG region. As a result, Scenario C is highly focused on refill development (infill and redevelopment) within urban cores and around high quality transit, fixed-route stops. The scenario rules are as follows:

- **Growth constrained by the Scenario C boundary.** All new residential and employment growth fell within the Scenario C boundaries, except for Entitlement Areas and specified Institutional/ University/Military zones from the Series 13 2050 dataset.
- **Allocation of units to SGOA MGRAs.** Growth was allocated to SGOA geographies within the Scenario C boundaries. Place Types were assigned based on the type of SGOA and a base-year assessment of whether a given MGRA had a residential, commercial, or mixed-use focus.
- **Allocation of units to transit proximate locations.** The next pass allocated units to transit-proximate locations using the base-year assessment of a given MGRA's primary focus type, and its proximity to transit within the Scenario C boundaries. The intensity of new growth was determined by the quantity of dwelling units and employment required to meet the zonal distributions of the Series 13 2050 scenario.
- **Allocation of industrial units to planned industrial MGRAs within the Scenario C boundaries.** To meet the zonal distributions of industrial employment, industrial focused place types were assigned to MGRAs within the Scenario C boundaries which contained planned industrial land uses from the Series 13 2050 dataset.
- **All new growth avoided redevelopment of single family dwelling unit parcels.** A parcel level analysis was used to identify which parcels fell within urban, greenfield, or constrained lands based on the UrbanFootprint landtype dataset. Single family parcels that fell within Scenario C boundaries, and were not specifically identified as being likely to redevelop or intensify in the Series 13 Forecast, were not allowed to take new growth or be redeveloped.
- **All new growth avoided 'constrained land'.** All parcels classified as constrained, which includes parks, open space, protected lands, conserved lands and steep slopes, were not allowed to take new growth.
- **Allocation of base-year attributes to all no-change areas.** All remaining MGRAs that did not receive any new growth were passed attributes from the scenario base year (2012), as depicted in the UrbanFootprint base 'canvas' upon which all future growth or change is applied.

Figure 4: Scenario C Boundary



ⁱ The UrbanFootprint sketch model work to test the alternative land use scenarios is being funded in part through a grant awarded by the [Strategic Growth Council](#). The statements and conclusions resulting from these efforts are not necessarily those of the Strategic Growth Council or of the Department of Conservation, or its employees. The Strategic Growth Council and the Department make no warranties, express or implied, and assume no liability for the statements or the information contained in the work products.