



Session 1.1

Elysium: Creating the policy and legal framework to support the role of urban forests as public health infrastructure

Chair: Kathy Abusow



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

Washington DC, 2023

The relationship between green infrastructure and public health in land use planning



Presented by

Anna Sunding, PhD Student
Swedish University of Agricultural Sciences

Thomas B. Randrup, Helena Nordh,
Åsa Ode Sang, Kjell Nilsson



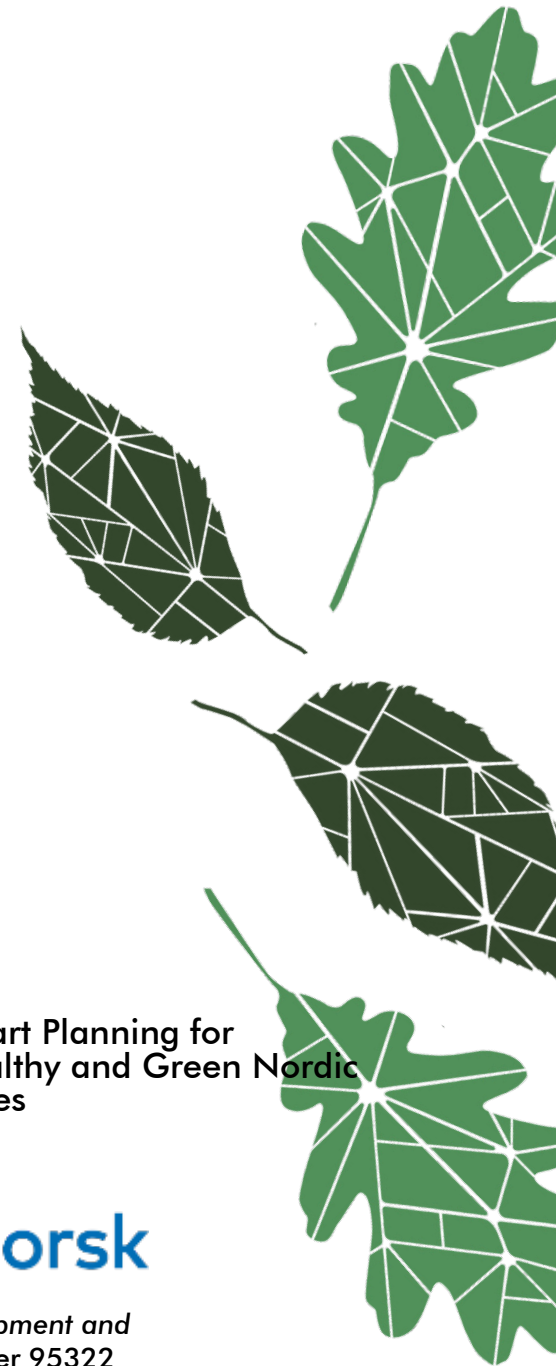
Smart Planning for
Healthy and Green Nordic
Cities

Funded by



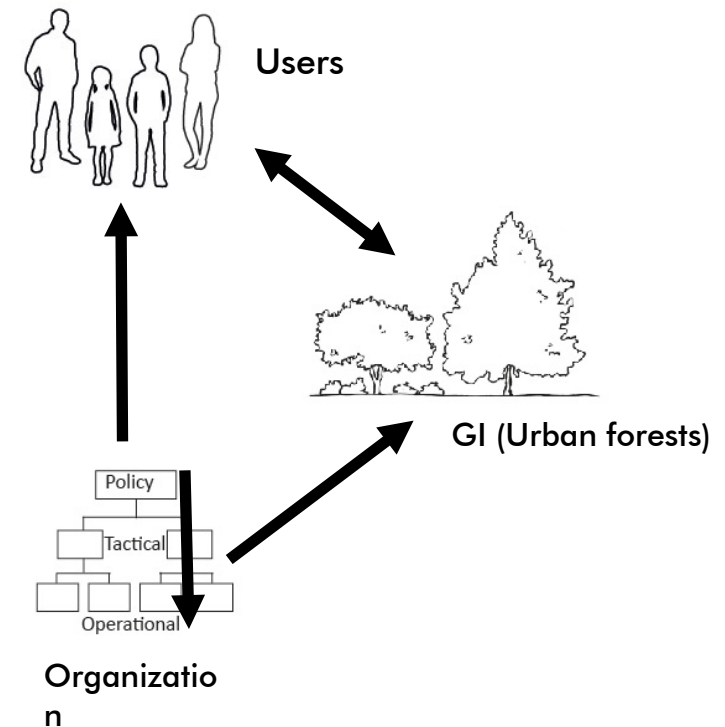
NordForsk

*Sustainable Urban Development and
Smart cities, Project number 95322*



Green infrastructure as a health promoting resource

- Well established connection between GI and human health
(Hartig et al., 2014; WHO ROFE, 2016; Markevych et al., 2017; van den Bosch & Ode Sang, 2017; Bratman et al., 2019)
- Effective land use planning is fundamental for delivering increased and equitable HH&W outcomes (Sallis et al., 2017; WHO, 2020)
- Overarching plans specify and prioritize land use to reflect political long-term ambitions guide subsequent planning stages
- Growing but still relatively sparse knowledge on how the relation is handled in planning practice

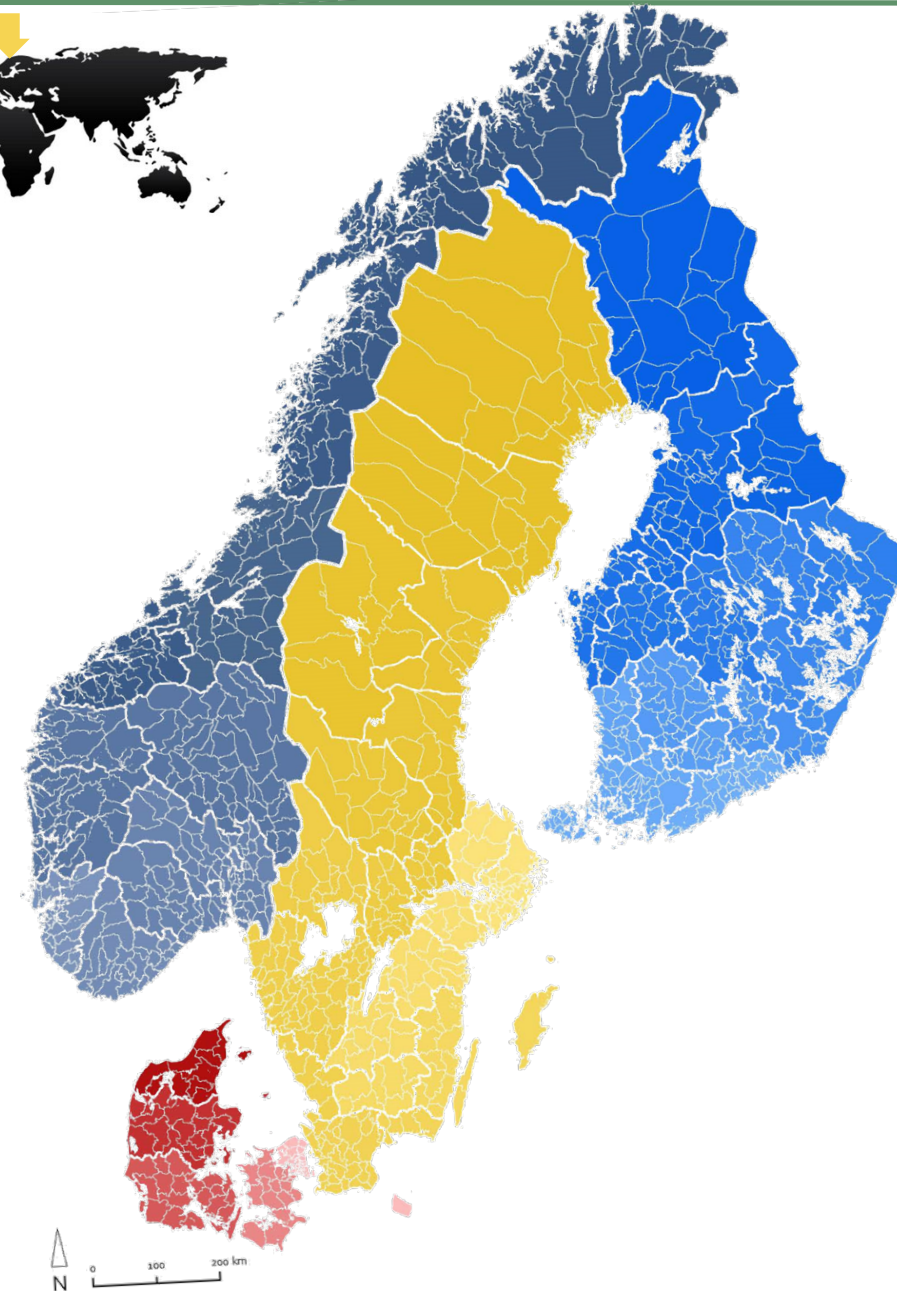




The Nordic context:

Denmark, Norway, Finland, Sweden

- Similar from a global perspective, **Welfare states** with **high local government autonomy** (Borges et al., 2017)
- Similar **planning traditions** and **public health promotional responsibilities** on local gov. level (Davies and Laforteza, 2017; Helgesen et al., 2014)
- Share the **comprehensive plan** as most **overarching planning document on local level** (Borges et al., 2017)





How is the GI-HH&W relationship described in Nordic comprehensive plans?

- What terminology is used?
- How are the concepts interlinked?
- Which goals are mentioned?

Plans studied in

Täby (SE), Espoo (FI)

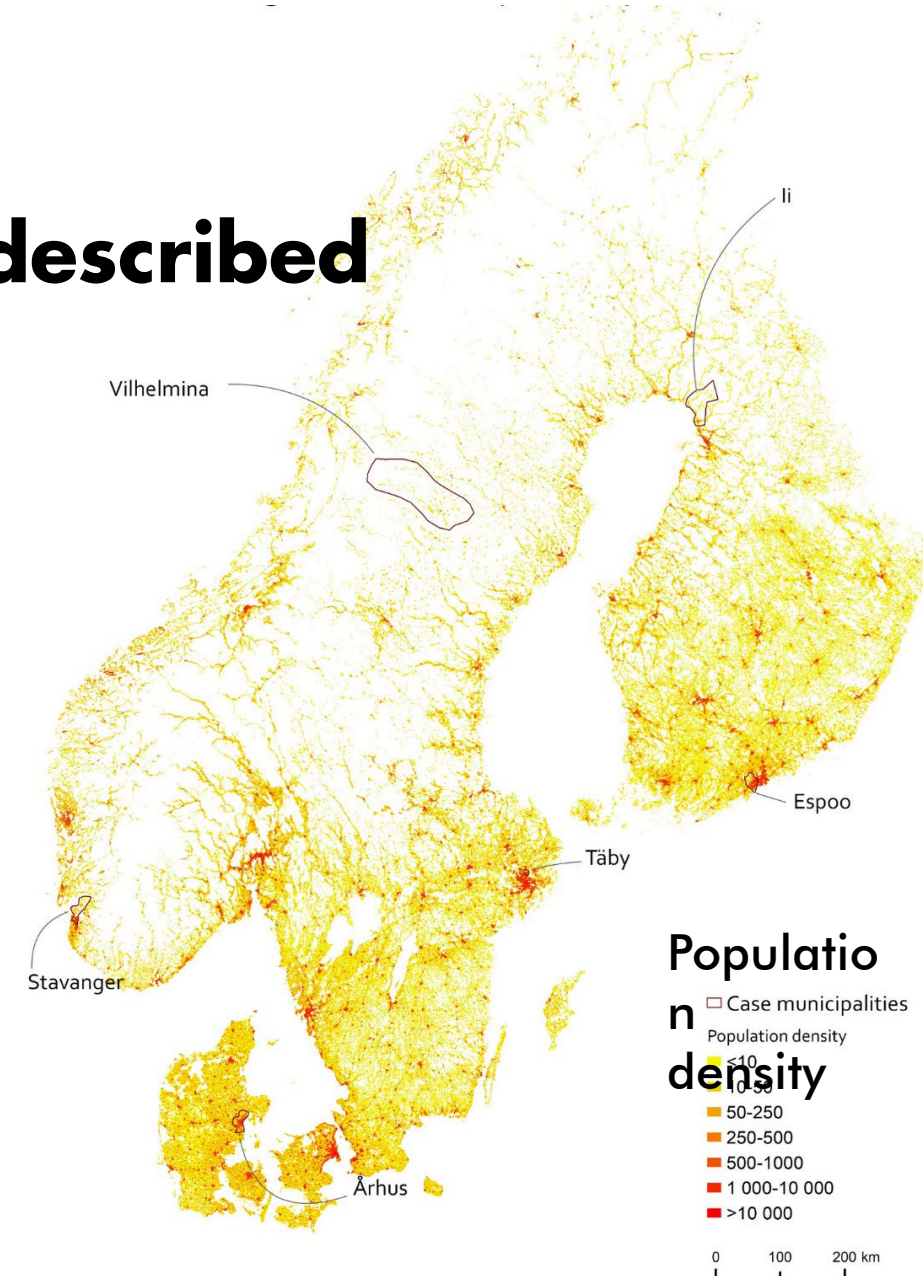
Stavanger (NO), Aarhus (DK)

Ii (FI), Vilhelmina (SE)

Capital region

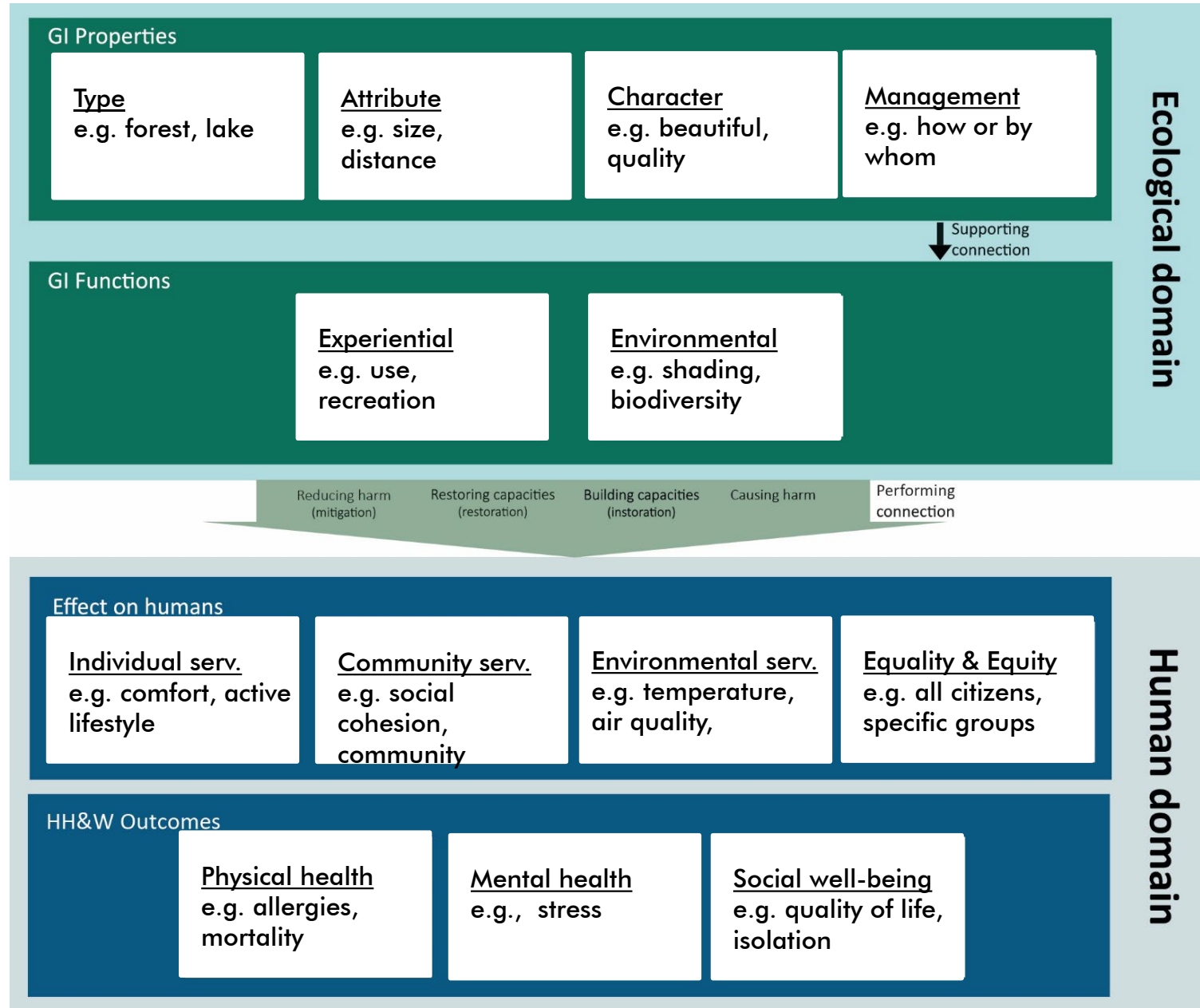
2nd tier cities

Remote rural





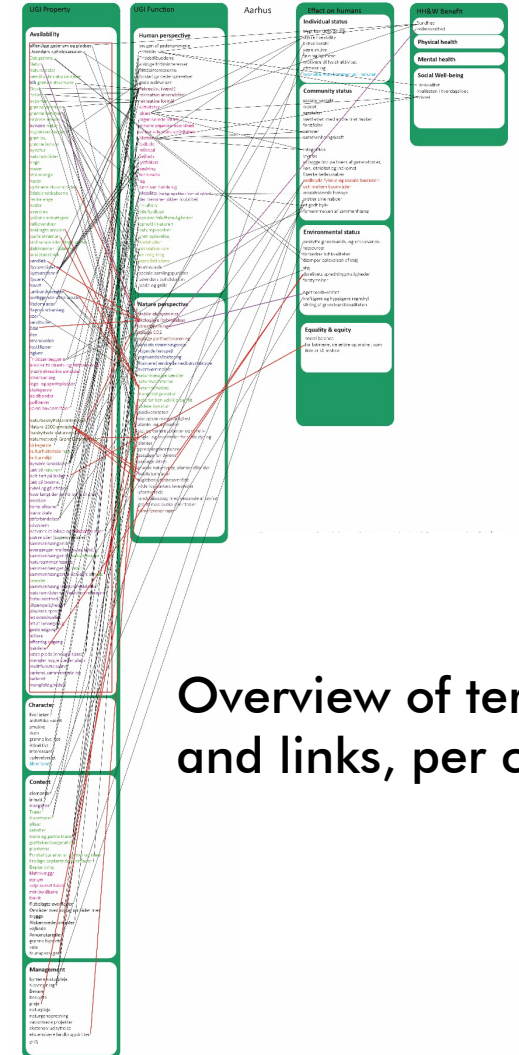
Analytical Framework



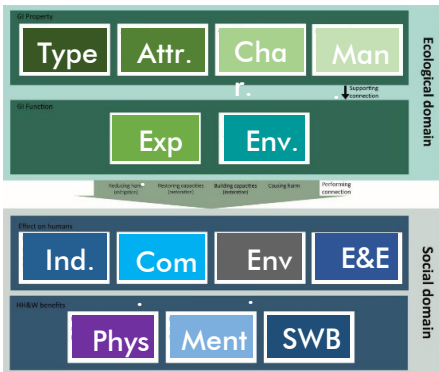


Document content analysis

Pedestrian and bicycle paths as well as outdoor routes also serve as important sport venues and recreational destinations, which increase residents' exercise and thus also contribute to improving public health. *Espoo*



Overview of terms and links, per city

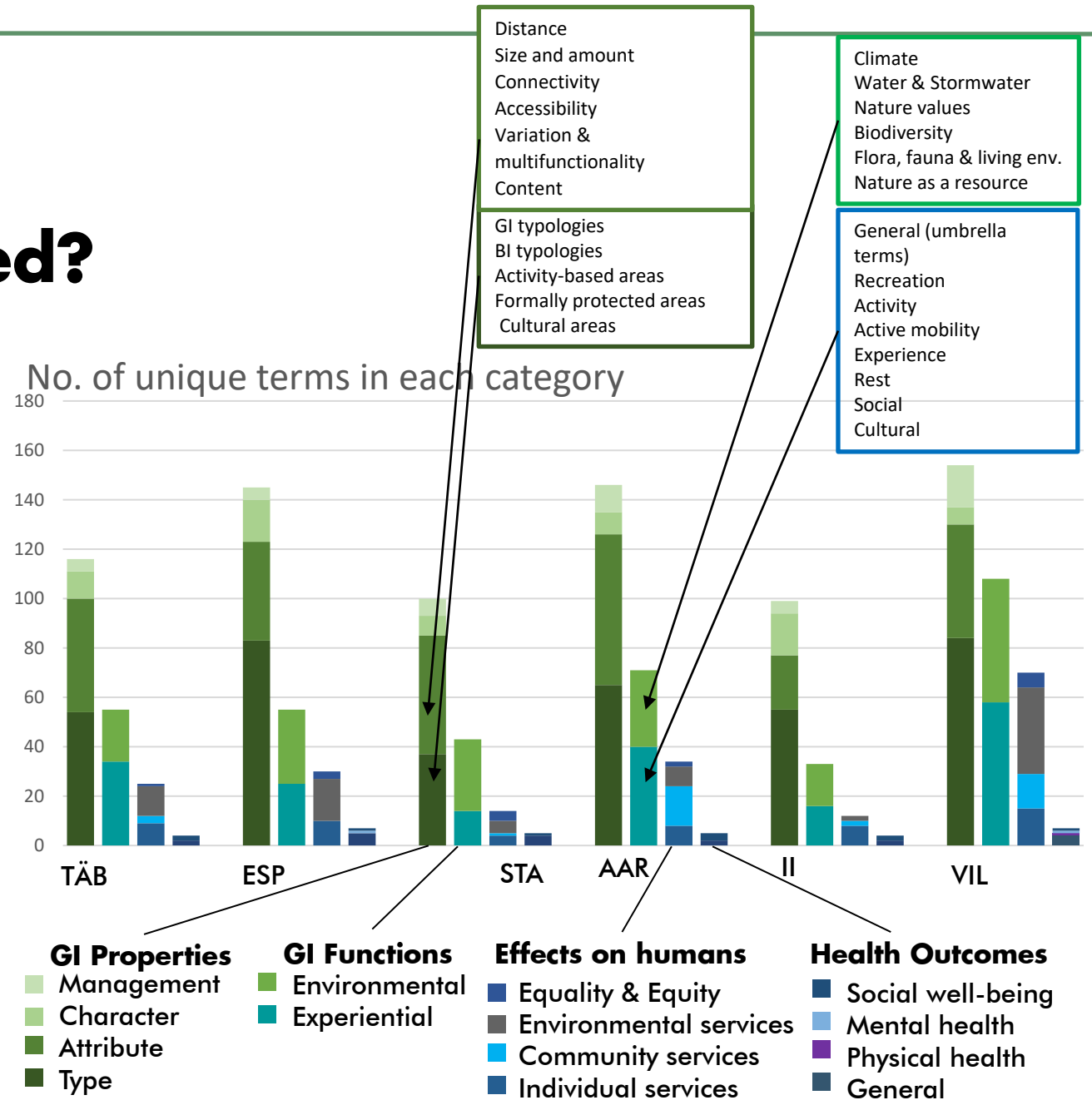
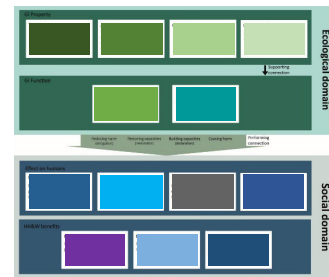


Adapted from Ewing et al. 2014, Shuman et al. 2015, WHO 2014, Markevych et al. 2017



What terminology is used?

- Common nuanced description of GI Properties and GI Functions (Sub categories needed)
- Effects on humans primarily include harm prevention
- Health outcomes are scarce and undifferentiated



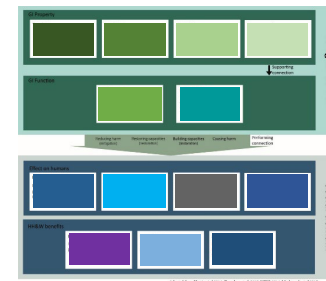
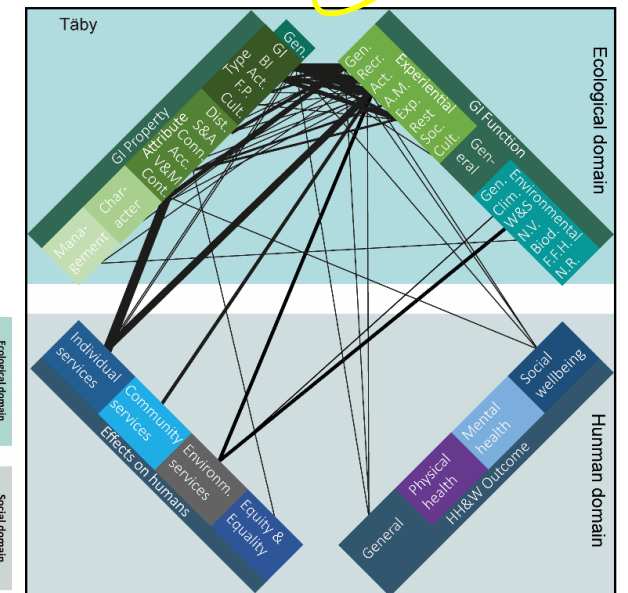
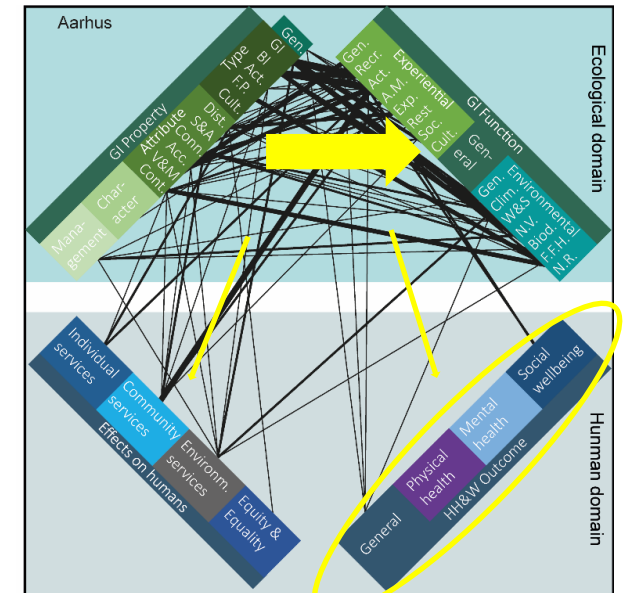


How are the concepts interlinked?

Pedestrian and bicycle paths as well as outdoor routes also serve as important sport venues and recreational destinations, which increase residents' exercise and thus also contribute to improving public health. *Espoo*

Bolder lines = more links

- Similar strong connections between Types & Attributes of GI, and Functions of GI
- Does not translate to effects or health outcomes
- Scarce and less coherent connections between the Ecological and Human domain



Adapted from Berglund et al. (2014), based on: (2013), (2012), (2011), (2010), (2009), (2008), (2007), (2006), (2005), (2004), (2003), (2002), (2001), (2000), (1999), (1998), (1997), (1996), (1995), (1994), (1993), (1992), (1991), (1990), (1989), (1988), (1987), (1986), (1985), (1984), (1983), (1982), (1981), (1980), (1979), (1978), (1977), (1976), (1975), (1974), (1973), (1972), (1971), (1970), (1969), (1968), (1967), (1966), (1965), (1964), (1963), (1962), (1961), (1960), (1959), (1958), (1957), (1956), (1955), (1954), (1953), (1952), (1951), (1950), (1949), (1948), (1947), (1946), (1945), (1944), (1943), (1942), (1941), (1940), (1939), (1938), (1937), (1936), (1935), (1934), (1933), (1932), (1931), (1930), (1929), (1928), (1927), (1926), (1925), (1924), (1923), (1922), (1921), (1920), (1919), (1918), (1917), (1916), (1915), (1914), (1913), (1912), (1911), (1910), (1909), (1908), (1907), (1906), (1905), (1904), (1903), (1902), (1901), (1900), (1899), (1898), (1897), (1896), (1895), (1894), (1893), (1892), (1891), (1890), (1889), (1888), (1887), (1886), (1885), (1884), (1883), (1882), (1881), (1880), (1879), (1878), (1877), (1876), (1875), (1874), (1873), (1872), (1871), (1870), (1869), (1868), (1867), (1866), (1865), (1864), (1863), (1862), (1861), (1860), (1859), (1858), (1857), (1856), (1855), (1854), (1853), (1852), (1851), (1850), (1849), (1848), (1847), (1846), (1845), (1844), (1843), (1842), (1841), (1840), (1839), (1838), (1837), (1836), (1835), (1834), (1833), (1832), (1831), (1830), (1829), (1828), (1827), (1826), (1825), (1824), (1823), (1822), (1821), (1820), (1819), (1818), (1817), (1816), (1815), (1814), (1813), (1812), (1811), (1810), (1809), (1808), (1807), (1806), (1805), (1804), (1803), (1802), (1801), (1800), (1799), (1798), (1797), (1796), (1795), (1794), (1793), (1792), (1791), (1790), (1789), (1788), (1787), (1786), (1785), (1784), (1783), (1782), (1781), (1780), (1779), (1778), (1777), (1776), (1775), (1774), (1773), (1772), (1771), (1770), (1769), (1768), (1767), (1766), (1765), (1764), (1763), (1762), (1761), (1760), (1759), (1758), (1757), (1756), (1755), (1754), (1753), (1752), (1751), (1750), (1749), (1748), (1747), (1746), (1745), (1744), (1743), (1742), (1741), (1740), (1739), (1738), (1737), (1736), (1735), (1734), (1733), (1732), (1731), (1730), (1729), (1728), (1727), (1726), (1725), (1724), (1723), (1722), (1721), (1720), (1719), (1718), (1717), (1716), (1715), (1714), (1713), (1712), (1711), (1710), (1709), (1708), (1707), (1706), (1705), (1704), (1703), (1702), (1701), (1700), (1699), (1698), (1697), (1696), (1695), (1694), (1693), (1692), (1691), (1690), (1689), (1688), (1687), (1686), (1685), (1684), (1683), (1682), (1681), (1680), (1679), (1678), (1677), (1676), (1675), (1674), (1673), (1672), (1671), (1670), (1669), (1668), (1667), (1666), (1665), (1664), (1663), (1662), (1661), (1660), (1659), (1658), (1657), (1656), (1655), (1654), (1653), (1652), (1651), (1650), (1649), (1648), (1647), (1646), (1645), (1644), (1643), (1642), (1641), (1640), (1639), (1638), (1637), (1636), (1635), (1634), (1633), (1632), (1631), (1630), (1629), (1628), (1627), (1626), (1625), (1624), (1623), (1622), (1621), (1620), (1619), (1618), (1617), (1616), (1615), (1614), (1613), (1612), (1611), (1610), (1609), (1608), (1607), (1606), (1605), (1604), (1603), (1602), (1601), (1600), (1599), (1598), (1597), (1596), (1595), (1594), (1593), (1592), (1591), (1590), (1589), (1588), (1587), (1586), (1585), (1584), (1583), (1582), (1581), (1580), (1579), (1578), (1577), (1576), (1575), (1574), (1573), (1572), (1571), (1570), (1569), (1568), (1567), (1566), (1565), (1564), (1563), (1562), (1561), (1560), (1559), (1558), (1557), (1556), (1555), (1554), (1553), (1552), (1551), (1550), (1549), (1548), (1547), (1546), (1545), (1544), (1543), (1542), (1541), (1540), (1539), (1538), (1537), (1536), (1535), (1534), (1533), (1532), (1531), (1530), (1529), (1528), (1527), (1526), (1525), (1524), (1523), (1522), (1521), (1520), (1519), (1518), (1517), (1516), (1515), (1514), (1513), (1512), (1511), (1510), (1509), (1508), (1507), (1506), (1505), (1504), (1503), (1502), (1501), (1500), (1499), (1498), (1497), (1496), (1495), (1494), (1493), (1492), (1491), (1490), (1489), (1488), (1487), (1486), (1485), (1484), (1483), (1482), (1481), (1480), (1479), (1478), (1477), (1476), (1475), (1474), (1473), (1472), (1471), (1470), (1469), (1468), (1467), (1466), (1465), (1464), (1463), (1462), (1461), (1460), (1459), (1458), (1457), (1456), (1455), (1454), (1453), (1452), (1451), (1450), (1449), (1448), (1447), (1446), (1445), (1444), (1443), (1442), (1441), (1440), (1439), (1438), (1437), (1436), (1435), (1434), (1433), (1432), (1431), (1430), (1429), (1428), (1427), (1426), (1425), (1424), (1423), (1422), (1421), (1420), (1419), (1418), (1417), (1416), (1415), (1414), (1413), (1412), (1411), (1410), (1409), (1408), (1407), (1406), (1405), (1404), (1403), (1402), (1401), (1400), (1399), (1398), (1397), (1396), (1395), (1394), (1393), (1392), (1391), (1390), (1389), (1388), (1387), (1386), (1385), (1384), (1383), (1382), (1381), (1380), (1379), (1378), (1377), (1376), (1375), (1374), (1373), (1372), (1371), (1370), (1369), (1368), (1367), (1366), (1365), (1364), (1363), (1362), (1361), (1360), (1359), (1358), (1357), (1356), (1355), (1354), (1353), (1352), (1351), (1350), (1349), (1348), (1347), (1346), (1345), (1344), (1343), (1342), (1341), (1340), (1339), (1338), (1337), (1336), (1335), (1334), (1333), (1332), (1331), (1330), (1329), (1328), (1327), (1326), (1325), (1324), (1323), (1322), (1321), (1320), (1319), (1318), (1317), (1316), (1315), (1314), (1313), (1312), (1311), (1310), (1309), (1308), (1307), (1306), (1305), (1304), (1303), (1302), (1301), (1300), (1299), (1298), (1297), (1296), (1295), (1294), (1293), (1292), (1291), (1290), (1289), (1288), (1287), (1286), (1285), (1284), (1283), (1282), (1281), (1280), (1279), (1278), (1277), (1276), (1275), (1274), (1273), (1272), (1271), (1270), (1269), (1268), (1267), (1266), (1265), (1264), (1263), (1262), (1261), (1260), (1259), (1258), (1257), (1256), (1255), (1254), (1253), (1252), (1251), (1250), (1249), (1248), (1247), (1246), (1245), (1244), (1243), (1242), (1241), (1240), (1239), (1238), (1237), (1236), (1235), (1234), (1233), (1232), (1231), (1230), (1229), (1228), (1227), (1226), (1225), (1224), (1223), (1222), (1221), (1220), (1219), (1218), (1217), (1216), (1215), (1214), (1213), (1212), (1211), (1210), (1209), (1208), (1207), (1206), (1205), (1204), (1203), (1202), (1201), (1200), (1199), (1198), (1197), (1196), (1195), (1194), (1193), (1192), (1191), (1190), (1189), (1188), (1187), (1186), (1185), (1184), (1183), (1182), (1181), (1180), (1179), (1178), (1177), (1176), (1175), (1174), (1173), (1172), (1171), (1170), (1169), (1168), (1167), (1166), (1165), (1164), (1163), (1162), (1161), (1160), (1159), (1158), (1157), (1156), (1155), (1154), (1153), (1152), (1151), (1150), (1149), (1148), (1147), (1146), (1145), (1144), (1143), (1142), (1141), (1140), (1139), (1138), (1137), (1136), (1135), (1134), (1133), (1132), (1131), (1130), (1129), (1128), (1127), (1126), (1125), (1124), (1123), (1122), (1121), (1120), (1119), (1118), (1117), (1116), (1115), (1114), (1113), (1112), (1111), (1110), (1109), (1108), (1107), (1106), (1105), (1104), (1103), (1102), (1101), (1100), (1099), (1098), (1097), (1096), (1095), (1094), (1093), (1092), (1091), (1090), (1089), (1088), (1087), (1086), (1085), (1084), (1083), (1082), (1081), (1080), (1079), (1078), (1077), (1076), (1075), (1074), (1073), (1072), (1071), (1070), (1069), (1068), (1067), (1066), (1065), (1064), (1063), (1062), (1061), (1060), (1059), (1058), (1057), (1056), (1055), (1054), (1053), (1052), (1051), (1050), (1049), (1048), (1047), (1046), (1045), (1044), (1043), (1042), (1041), (1040), (1039), (1038), (1037), (1036), (1035), (1034), (1033), (1032), (1031), (1030), (1029), (1028), (1027), (1026), (1025), (1024), (1023), (1022), (1021), (1020), (1019), (1018), (1017), (1016), (1015), (1014), (1013), (1012), (1011), (1010), (1009), (1008), (1007), (1006), (1005), (1004), (1003), (1002), (1001), (1000), (999), (998), (997), (996), (995), (994), (993), (992), (991), (990), (989), (988), (987), (986), (985), (984), (983), (982), (981), (980), (979), (978), (977), (976), (975), (974), (973), (972), (971), (970), (969), (968), (967), (966), (965), (964), (963), (962), (961), (960), (959), (958), (957), (956), (955), (954), (953), (952), (951), (950), (949), (948), (947), (946), (945), (944), (943), (942), (941), (940), (939), (938), (937), (936), (935), (934), (933), (932), (931), (930), (929), (928), (927), (926), (925), (924), (923), (922), (921), (920), (919), (918), (917), (916), (915), (914), (913), (912), (911), (910), (909), (908), (907), (906), (905), (904), (903), (902), (901), (900), (899), (898), (897), (896), (895), (894), (893), (892), (891), (890), (889), (888), (887), (886), (885), (884), (883), (882), (881), (880), (879), (878), (877), (876), (875), (874), (873), (872), (871), (870), (869), (868), (867), (866), (865), (864), (863), (862), (861), (860), (859), (858), (857), (856), (855), (854), (853), (852), (851), (850), (849), (848), (847), (846), (845), (844), (843), (842), (841), (840), (839), (838), (837), (836), (835), (834), (833), (832), (831), (830), (829), (828), (827), (826), (825), (824), (823), (822), (821), (820), (819), (818), (817), (816), (815), (814), (813), (812), (811), (810), (809), (808), (807), (806), (805), (804), (803), (802), (801), (800), (799), (798), (797), (796), (795), (794), (793), (792), (791), (790), (789), (788), (787), (786), (785), (784), (783), (782), (781), (780), (779), (778), (777), (776), (775), (774), (773), (772), (771), (770), (769), (768), (767), (766), (765), (764), (763), (762), (761), (760), (759), (758), (757), (756), (755), (754), (753), (752), (751), (750), (749), (748), (747), (746), (745), (744), (743), (742), (741), (740), (739), (738), (737), (736), (735), (734), (733), (732), (731), (730), (729), (728), (727), (726), (725), (724), (723), (722), (721), (720), (719), (718), (717), (716), (715), (714), (713), (712), (711), (710), (709), (708), (707), (706), (705), (704), (703), (702), (701), (700), (699), (698), (697), (696), (695), (694), (693), (692), (691), (690), (689), (688), (687), (686), (685), (684), (683), (682), (681), (680), (679), (678), (677), (676), (675), (674), (673), (672), (671), (670), (669), (668), (667), (666), (665), (664), (663), (662), (661), (660), (659), (658), (657), (656), (655), (654), (653), (652), (651), (650), (649), (648), (647), (646), (645), (644), (643), (642), (641), (640), (639), (638), (637), (636), (635), (634), (633), (632), (631), (630), (629), (628), (627), (626), (625), (624), (623), (622), (621), (620), (619), (618), (617), (616), (615), (614), (613), (612), (611), (610), (609), (608), (607), (606), (605), (604), (603), (602), (601), (600), (599), (598), (597), (596), (595), (594), (593), (592), (591), (590), (589), (588), (587), (586), (585), (584), (583), (582), (581), (580), (579), (578), (577), (576), (575), (574), (573), (572), (571), (570), (569), (568), (567), (566), (565), (564), (563), (562), (561), (560), (559), (558), (557), (556), (555), (554), (553), (552), (551), (550), (549), (548), (547), (546), (545), (544), (543), (542), (541), (540), (539), (538), (537), (536), (535), (534), (533), (532), (531), (530), (529), (528), (527), (526), (525), (524), (523), (522), (521), (520), (519), (518), (517), (516), (515), (514), (513), (512), (511), (510), (509), (508), (507), (506), (505), (504), (503), (502), (501), (500), (499), (498), (497), (496), (495), (494), (493), (492), (491), (490), (489), (488), (487), (486), (485), (484), (483), (482), (481), (480), (479), (478), (477), (476), (475), (474), (473), (472), (471), (470), (469), (468), (467), (466), (465), (464), (463), (462), (461), (460), (459), (458), (457), (456), (455), (454), (453), (452), (451), (450), (449), (448), (447), (446), (445), (444), (443), (442), (441), (440), (439), (438), (437), (436), (435), (434), (433), (432), (431), (430), (429), (428), (427), (426), (425), (424), (423), (422), (421), (420), (419), (418), (417), (416), (415), (414), (413), (412), (411), (410), (409), (408), (407), (406), (405), (404), (403), (402), (401), (400), (399), (398), (397), (396), (395), (394), (393), (392), (391), (390), (389), (388), (387), (386), (385), (384), (383), (382), (381), (380), (379), (378), (377), (376), (375), (374), (373), (372), (371), (370), (369), (368), (367), (366), (365), (364), (363), (362), (361), (360), (359), (358), (357), (356), (355), (354), (353), (352), (351), (350), (349), (348), (347), (346), (345), (344), (343), (342), (341), (340), (339), (338), (337), (336), (335), (334), (333), (332), (331), (330), (329), (328), (327), (326), (325), (324), (323), (322), (321), (320), (319), (318), (317), (316), (315), (314), (313), (312), (311), (310), (309), (308), (307), (306), (305), (304), (303), (302), (301), (300), (299), (298), (297), (296), (295), (294), (293), (292), (291), (290), (289), (288), (287), (286), (285), (284), (283), (282), (281), (280), (279), (278), (277), (276), (275), (274), (273), (272), (271), (270), (269), (268), (267), (266), (265), (264), (263), (262), (261), (260), (259), (258), (257), (256), (255), (254), (253), (252), (251), (250), (249), (248), (247), (246), (245), (244), (243), (242), (241), (240), (239), (238), (237), (236), (235), (234), (233), (232), (231), (230), (229), (228), (227), (226), (225), (224), (223), (222), (221), (220), (219), (218), (217), (216), (215), (214), (213), (212), (211), (210), (209), (208), (207), (206), (205), (204), (203), (202), (201), (200), (199), (198), (197), (196), (195), (194), (193), (192), (191), (190), (189), (188), (187), (186), (185), (184), (183), (182), (181), (180), (179), (178), (177), (176), (175), (174), (173), (172), (171), (170), (169), (168), (167), (166), (165), (164), (163), (162), (161), (160), (159), (158), (157), (156), (155), (154), (153), (152), (151), (150), (149), (148), (147), (146), (145), (144), (143), (142), (141), (140), (139), (138), (137), (136), (135), (134), (133), (132), (131), (130), (129), (128), (127), (126), (125), (124), (123), (122), (121), (120), (119), (118), (117), (116), (115), (114), (113), (112), (111), (110), (109), (108), (107), (106), (105), (104), (103), (102), (101), (100), (99), (98), (97), (96), (95), (94), (93), (92), (91), (90), (89), (88), (87), (86), (85), (84), (83), (82), (81), (80), (79), (78), (77), (76), (75), (74), (73), (72), (71), (70), (69), (68), (67), (66), (65), (64), (63), (62), (61), (60), (59), (58), (57), (56), (55), (54), (53), (52), (51), (50), (49), (48), (47), (46), (45), (44), (43), (42), (41), (40), (39), (38), (37), (36), (35), (34), (33), (32), (31), (30), (29), (28), (27), (26), (25), (24), (23), (22), (21), (20), (19), (18), (17), (16), (15), (14), (13), (12), (11), (10), (9), (8), (7), (6), (5), (4), (3), (2), (1)



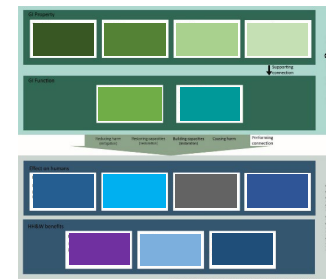
What goals are mentioned?

- Types of GI, and Attributes; distance, connectivity, accessibility
- Experiential GI Functions; “use”
- Equality (equal for all) & General health

“Wise use of space to create more nature & more health” (AAR)

“Increase forest area to 8000 ha before 2030, prioritizing new outdoor life opportunities close to the city.” (AAR)

“Develop the green half of the city to promote citizens’ quality of life, health and recreation – in dialogue with the citizens” (TÄB)



Terminology/City	TÄ	ES	ST	AA	II	VI
	B	P	A	R		L
Type						
GI	X	X	X	X	X	X
BI	X	X	X	X	X	X
Activity	X	X	X	X	X	X
Formal protection	X	X	X	X	X	X
Culture	X	X	X	X	X	X
Attribute						
Distance	X	X	X	X	X	X
Size & amount	X	X	X	X	X	X
Connectivity	X	X	X	X	X	X
Accessibility	X	X	X	X	X	X
Variation & multifunct.	X	X	X	X	X	X
Content	X	X	X	X	X	X
Character	X	X	X	X	X	X
Management	X	X	X	X	X	X
Experiential						
General(overall)	X	X	X	X	X	X
Recreation	X	X	X	X	X	X
Activity	X	X	X	X	X	X
Active mobility	X	X		X	X	X
Experience	X	X	X	X		X
Rest		X	X	X		X
Social	X			X		X
Cultural	X	X	X		X	X
Environmental						
General(theoretical)	X	X		X	X	X
Climate	X		X	X		X
Water& Storm water	X	X	X	X	X	X
Nature values	X	X	X	X	X	X
Biodiversity	X	X	X	X	X	X
Flora, fauna & living env.	X	X	X	X	X	X
Nature as resource					X	X
Individual service	X	X	X	X	X	X
Community service	X	X	X	X	X	X
Environment service	X	X	X	X	X	X
Equality & equity		X	X	X		X
General health	X	X	X	X	X	X
Physical health	X					X
Mental health		X				X
Social Well-being	X	X	X	X	X	X



Conclusions

- **Health outcomes are not a strong focus** and superficially described in the studied plans
- **Strong focus** on describing connections between Types of GI and Functions of GI
- **Strong focus** on general use and activities; **less focus** on rest and social aspects
- **In relation to Urban Forests:** Attributes such as size and characters describing naturalness, serenity which are key for de-stressing are generally lacking.
(Grahn and Stigsdotter, 2010; Ode et al., 2017)
- **Goals and visions** are scattered and generally **superficial and spacious**



And in practice? (Interview study w. GI & public health practitioners)

- **Plan goals are often spacious enough to support “anything”**
 - good and bad
- **Difference between “policy in plans” and “policy in use”**
 - generous green visions are ignored or ‘a hard bargain’ in implementation stages
- **Difference between planners’ and managers’ attitudes**
 - Resources don’t increase with responsibilities on operational levels
- **Overall economic rationale supports short term investment focus**
 - overlooking long term sustainability



Implications and take aways

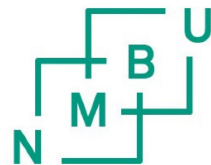
- **Current descriptions of the GI – public health are general, risk not withstand against other strong land use interests not guide decision-making in further stages**
- **Plans need differentiate land use needs in relation to a more nuanced description of intended health outcomes**
- **Plans contain abundant information, potential to reframe and sharpen**
- **With intended outcomes as a basis, implementation and long term sustainability needs to be addressed policy making in order to connect the circle from vision to evaluation**



Thank you

Anna Sunding | SLU

 **anna.sunding@slu.se**



Nordregio



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



International Society of Arboriculture



Smithsonian



2nd **World** **Forum on** **Urban** **Forests**

2023



**World Forum on
Urban Forests**

Bogotá
tiene mucho que
contar

URBAN FORESTS FOR LIFE

Public Policy Framework In BOGOTÁ

Martha Perdomo

General Director

JARDÍN BOTÁNICO DE BOGOTÁ

October 16, 2023



BOTANICAL GARDEN OF BOGOTA

Mission

To investigate and conserve flora, urban forests and green spaces of the high Andean and Paramo ecosystems, contributing to the generation, application and social contribution of knowledge, aiming for climate change adaptation, quality of life improvement and sustainable development of the Capital District and the Region.

Vision

In 2038 we will be recognized nationally and internationally as a reference research center in the high Andean and Paramo ecosystems and as a nature-focused destination, which contributes to the transformation of environmental thinking for the sustainability of the territory.



Conservation Research



Knowledge management in conservation, restoration and sustainable use of flora in areas of ecological structure and environmental interest in the city region.

RESEARCH CENTER
Science Ministry Res. 469 2022

Urban Green Space Management



Improve and increase ecological restoration, connectivity, Biodiversity, environmental functions and services and social aspects of plant cover and green infrastructure.

IN CONJUNCTION WITH THE
ENVIRONMENTAL SECRETARIAT

Conservation Education & Stewardship



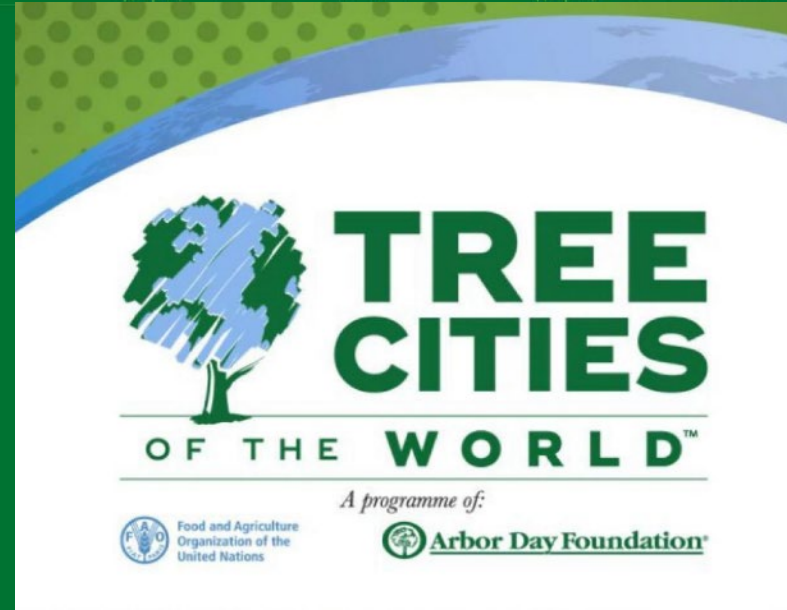
Education and environmental stewardship for the promotion of an environmental culture in Bogotá, and marketing strategies for institutional management.

EDUCATION LEADERS IN
BOGOTÁ D.C.

URBAN GREEN SPACE MANAGEMENT ACHIEVEMENTS & AWARDS

- * **Institutional agreement with the USDA-FS** for the application of the **iTree** model together with the SIGAU for the **calculation of ecosystem services of urban trees**.
- * **FAO and Arbor Day Foundation recognition** and membership for 3 consecutive years as part of **Tree Cities of The World**.
- * **First place** in the 2022 version of the “**Greening Cities**” recognition awarded by the **International Association of Horticultural Producers -AIPH)** - Urban Agriculture.
- * Joint formulation with Environmental Secretariat - SDA of the **urban forest implementation plan**, in compliance with the POT (Territorial Arrangement Planning).





Tree Cities of The World recognition for 3 consecutive years (2021, 2022, 2023) for **good practices in planning, technical and social management of urban trees, urban gardens, orchards, green spaces.**





AIPH
(International Association of
Horticultural Producers)
recognition

In 2022, the District Urban
Agriculture Program of Bogotá
received **First place**

In the **Greening City**
category: “Living green for
biodiversity”.

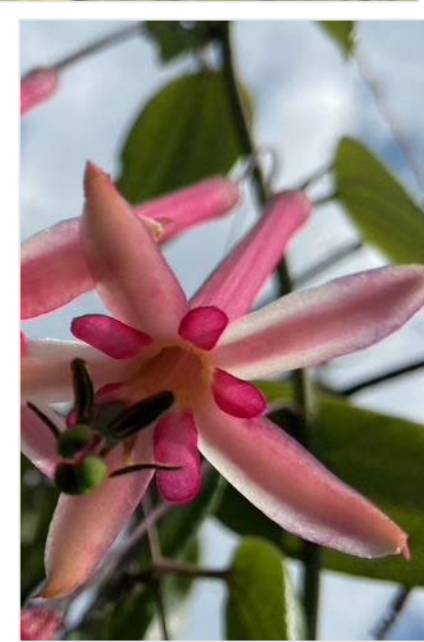




An URBAN FOREST is much more than just trees...



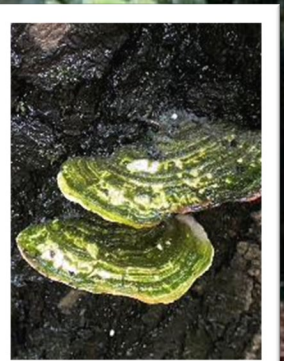
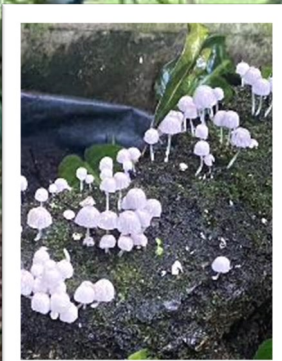
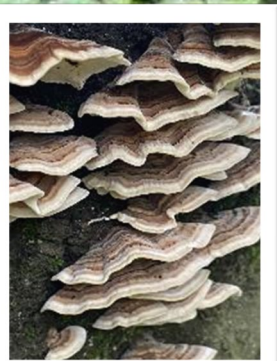
Urban forests promote the creation of habitat for multiple forms of life,



improve and increase the supply of ecosystem services and ecological connectivity,



Urban Forests consolidate and generate new green spaces, micro habitats and biodiversity flows.



Maintain biogeochemical cycles, protect the soil from erosion, regulate the water cycle and guarantee permeability.



Urban forests help to mitigate the effects of climate change (reduce heat islands) and improve air quality.

Presenta

Simposio Internacional *Vitamina N* Naturaleza y Salud

Naturaleza sana = personas sanas

Conoce el poder terapéutico de la reconexión con la naturaleza



Viernes
29
sept

Jornada académica
8:00 am a 5:00 pm
Transmisión
en vivo

Sábado
30
sept

Terapias de Naturaleza
8:00 am a 11:00 am
en parques ecológicos
de Bogotá

*Registro previo - confirmar correo disponible o google forms

They provide spaces for passive recreation, education and research, promoting stewardship, environmental governance and citizen-community participation.

MANUAL DE COBERTURAS VEGETALES DE BOGOTÁ, D. C.

Green Space & Urban Tree Canopy MANAGEMENT GUIDELINES

DESING & COMPOSITION CRITERIA



Gráfico 31.
Composición monocromática en arborización y jardinería



Gráfico 32.
Composición complementaria en arborización y jardinería



Gráfico 33.
Composición con colores diferentes en arborización y jardinería



Gráfico 34.
Composición de diferentes texturas en arborización y jardinería



Gráfico 35.
Composición con texturas similares en arborización y jardinería



Gráfico 36.
Masas en grupos en arborización y jardinería

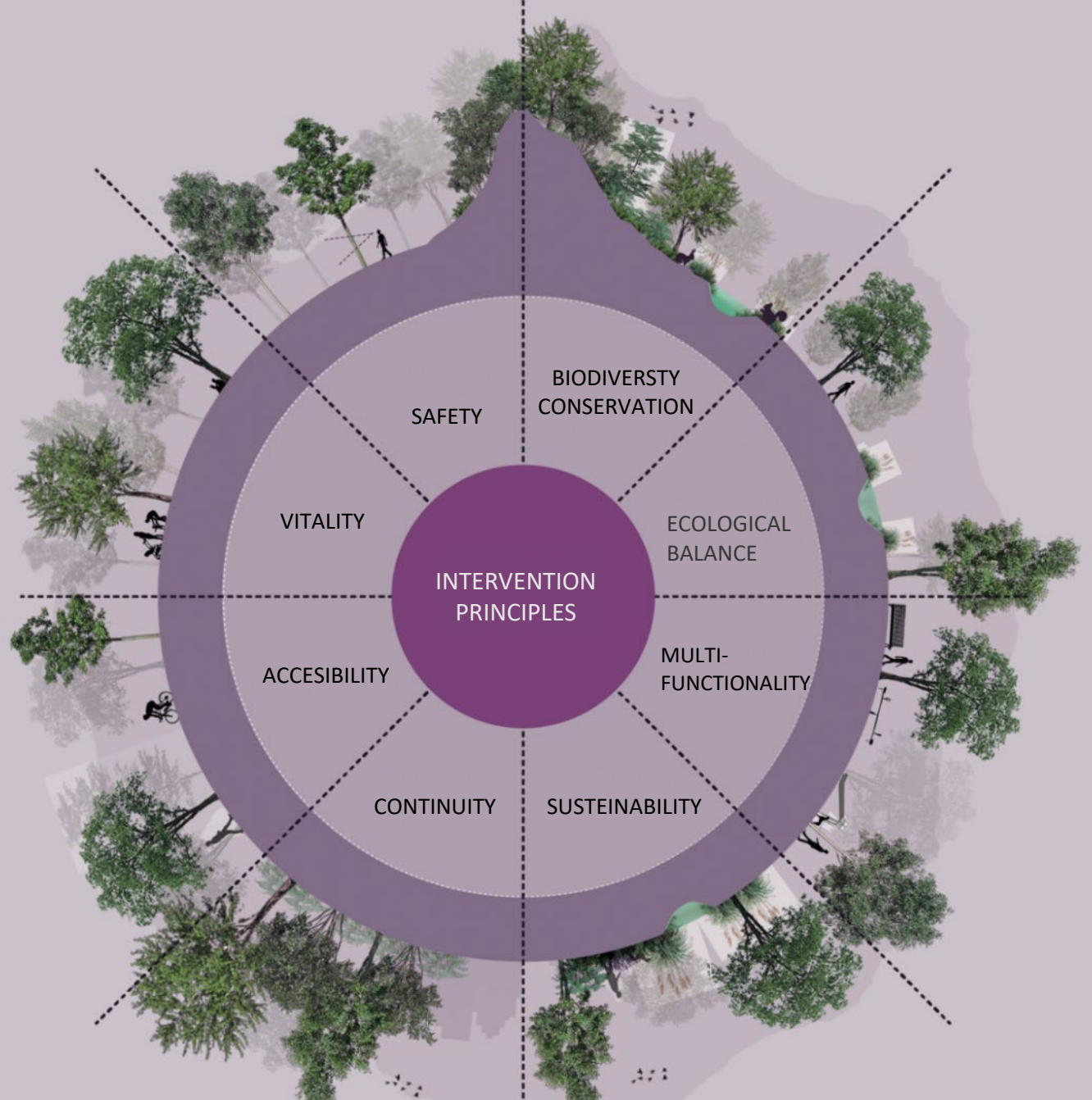
Technical guidelines for the planning and management of trees, gardens, orchards and urban forests, from plant production, planting, management, maintenance and care.



JARDÍN BOTÁNICO
DE BOGOTÁ



Universidad de
Los Andes
Colombia



Balance in the composition of the urban landscape

ABC of Urban Forests in Bogotá



Art. 110

District Development Plan (PDD)

How did this concept emerge in the city of Bogotá?

Art. 130

Territorial Management Plan (POT)

In Bogotá City we have 2 main planning legislative documents: The District Development Planning (PDD) and the Territorial Arrangement Planning (POT) for their Initials in Spanish.

The District Development Plan (PDD) 2020-2024, called "A new social and environmental contract for Bogota in the XXI century" in article 110' stays that:

The District Government will develop strategies for the consolidation of public or private green spaces, aiming to:

- To Improve the supply of ecosystem services for mitigation and adaptation to climate crisis.
- To prioritize the reconversion of hardscape to softscape, with native species and urban agro - parks.

The Territorial Management Plan (POT) Calls for the consolidation of urban forests as a silvicultural management strategy in the Main Ecological Structure (EEP) areas to promote biodiversity of multi-layered vegetation, favoring native species.

Where the following process must be taken under consideration:

- Design of indicators of elements part of the public space system for pedestrian use.
- Renaturalization and greening: increasing vegetation cover in quantity and diversity, with native species as a priority, to obtain greater benefits and services from biodiversity and ecosystems.

The District Administration, through the competent entities, integrates the concept of Urban Forest into the dyna



The District Administration, through the competent entities, integrates the concept of **Urban Forests** into the **dynamics of planning and territorial ordering of the city**, in order to be **managed and consolidated** in green spaces and/or **public spaces**, within the framework of the guidelines for environmental justice, equitable distribution of environmental burdens and benefits among all people in society, while strengthening the participation and cohesion of the social fabric (City Agreement 859 of 2022).



Urban Forests in the POT:

Bogota Greens Up is the name of the main environmental objective on the plan. It presents the following four goals:

1

Protecting and connecting the city's green areas.

2


increasing tree corridors, both in quality and quantity, to promote connectivity and social co-responsibility in its management and administration.

3

Combating climate change and heat islands.

4

Promoting ecological connectivity between diverse ecosystems, articulating it with the Main Ecological Structure (EEP).





Planned Urban Forests

- Brazo salitre canal
- Santa Helena
- San Carlos Forest
- Park way
- National Park

- Salitre Treatment Plan
- Simón Bolívar
- La Esmeralda urbanization
- Santa Lucia
- Diana Turbay

- Boyacá Modelia Canal
- Gustavo Uribe Botero
- Independencia
- Indio Park

- Zona Franca
- Arborizadora Alta
- Bavaria
- Arzobispo canal

21 new

**lungs
for Bogotá**

Among the responsibilities and competencies of the Capital District we have:

- ✓ **Prioritizing sectors of the city with the greatest deficits of trees,** green spaces and environmental quality.
- ✓ **Characterization of natural areas** and definition of management instruments.
- ✓ **Natural areas** typologies.
- ✓ **Composition and density of the urban forests,** management and monitoring.
- ✓ **Incorporation of ecosystemic and socio-environmental attributes** of urban forests in the City Management Tree System (SIGAU).

Where can an



Urban Forest be established

In parks, clubs, schools, residential complexes, partial plans, etc.

- In public space
- In private space
- Open green spaces (including lawn).

Where can an



Urban Forest not be established?

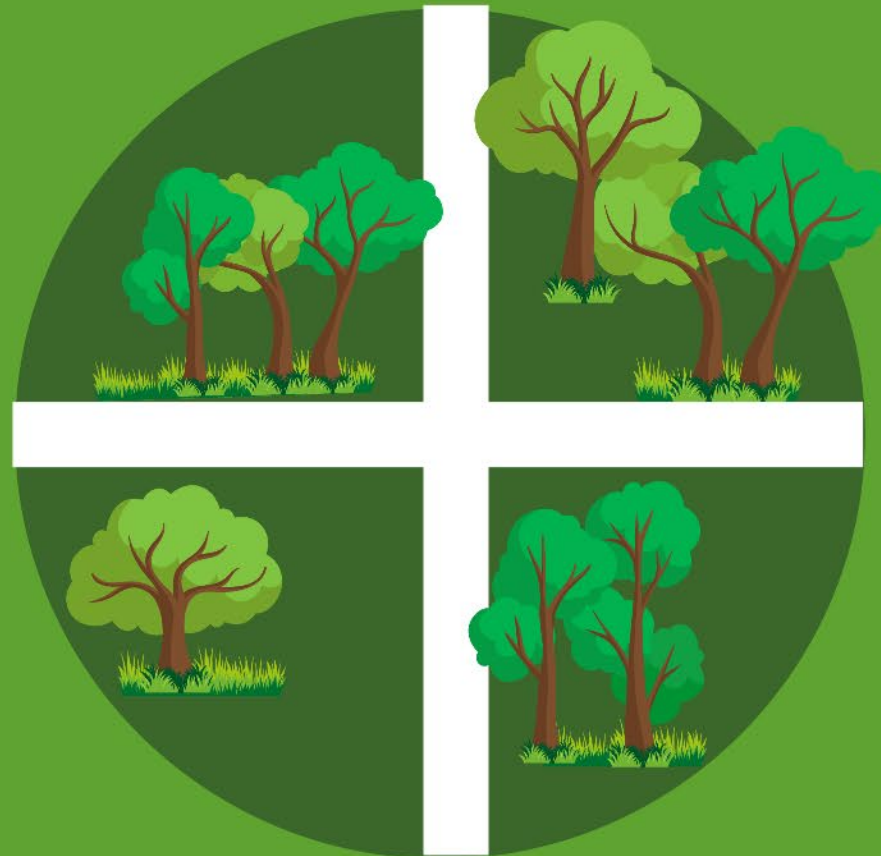
- In protected areas
- Road reserve (without studies or designs)
- Grounds destined for public or private works (without studies or designs)

Benefits of the Urban Forest

Economic aspects



- Increased value of real estate
- Promotion of green jobs
- Reduction in AVC systems usage



Environmental aspects



- Decreased air pollution
- Reduced impact of torrential rainfall
- Reduced impact of urban heat island (2°C to 8°C temperature reduction)
- Increased urban habitats and biodiversity
- Improved air quality

Benefits of the Urban Forest

Social aspects

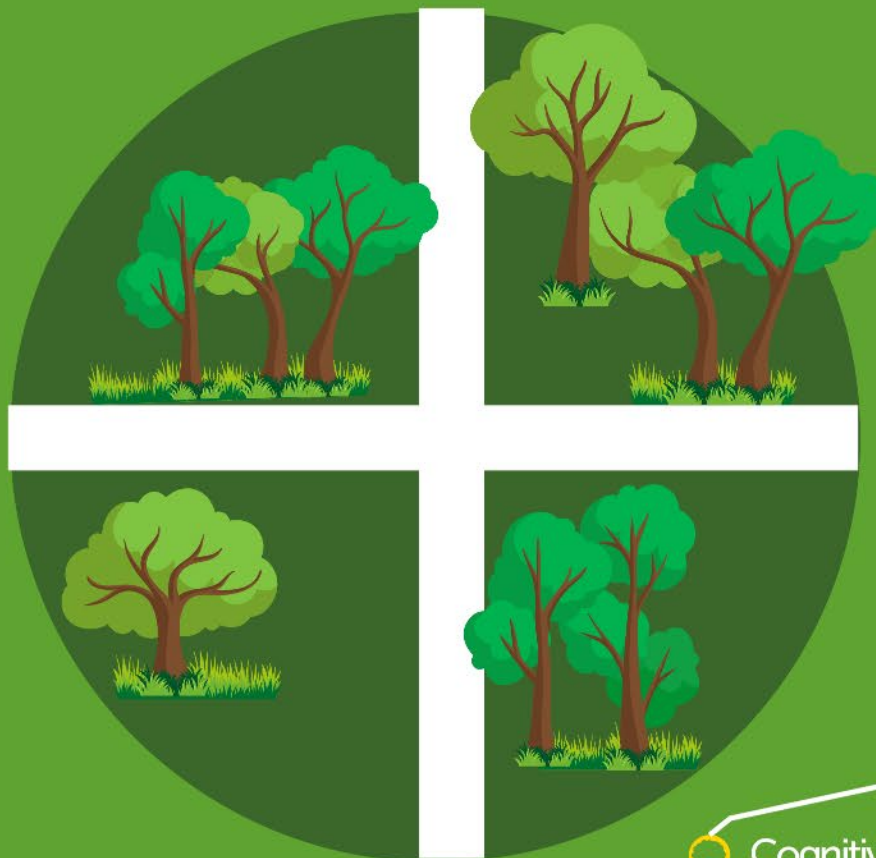


- Increased accessibility to green areas
- Meeting point for social dynamics
- Development of educational and social projects

Health aspects

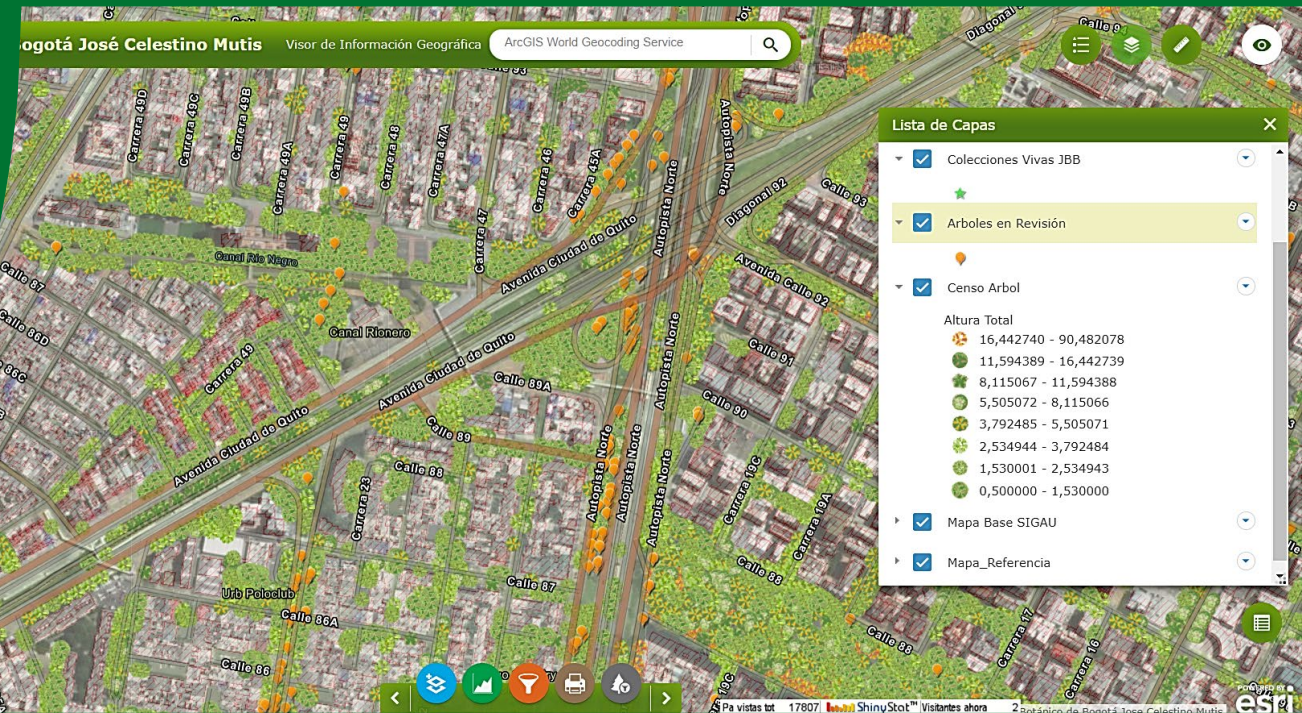
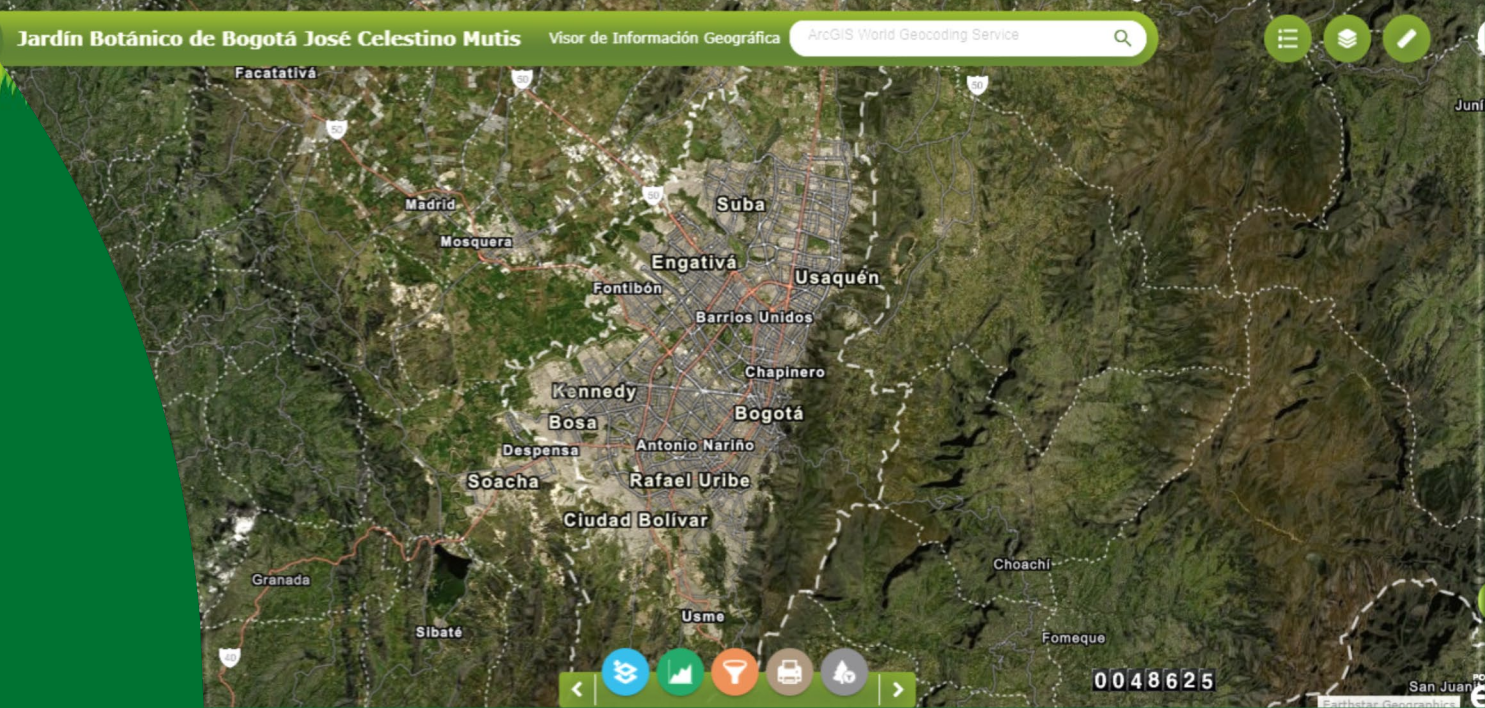


- General wellness promotion
- Stress reduction
- Physical, mental and emotional health improvements
- Reduction of sedentary lifestyles
- Calming, therapeutic areas
- Cognitive benefits



URBAN FOREST SIGAU REGISTRATION (Urban Trees Management System)

The Botanical Garden of Bogotá, in coordination with the District Environment Secretariat, will create the District Registry of Urban Forests, in the Urban Trees Management System of Bogotá D.C – SIGAU, in order to have a consolidated registry of these areas.



SIGAU APPS

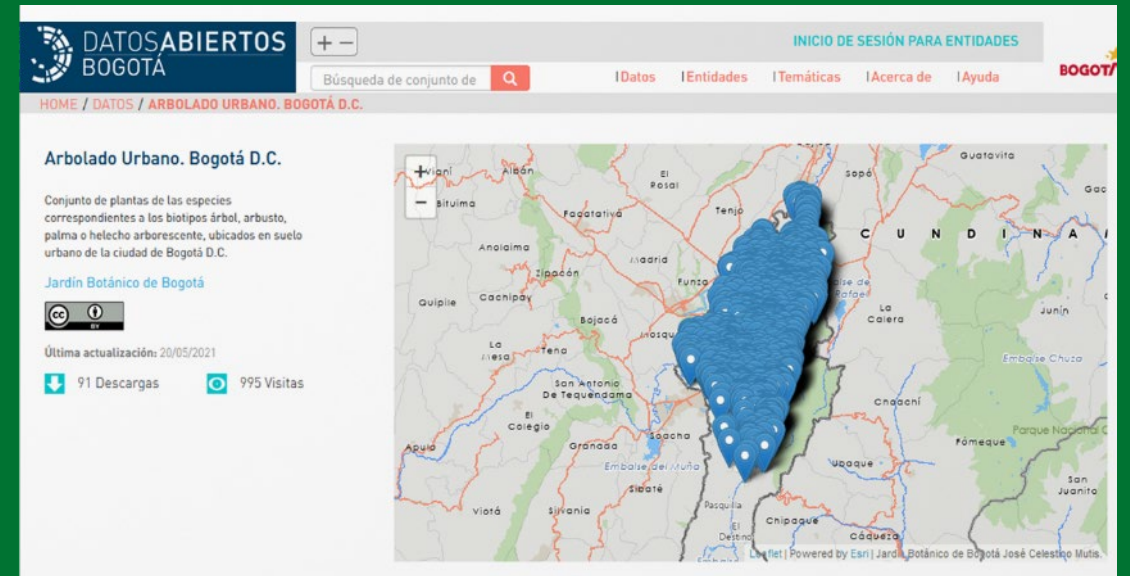


Geoportal

Indicators of geographically represented urban forests, number of trees, trees per hectare, diversity indices, distribution of groups by height, property and public space analysis, application for community or private application for new urban forests.

<https://datosabiertos.bogota.gov.co/dataset/censo-arbolado-urbano>

<https://jbb.gov.co/transparencia/datos-abiertos/publicacion-de-datos-abiertos/>



Upload and Download “Datos Abiertos Bogotá”

Publication of relevant and quality information from the public sector in structured formats available to users for reports, statistics, investigations, social control, business opportunities, among others.

Urban Tree App "Arbolapp Bogotá"



App Functionalities:

- * Urban trees and green space indicators
- * Planting rates
- * News y Reports
- * QR Code

Allows the visualization of trees within a radius of 100 m from any location.

SIGAU Applications



Thank You

2nd **World** **Forum on** **Urban** **Forests**

2023



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

Washington DC, 2023

Science to Policy

Nature in Urban Planning for Better Human Health



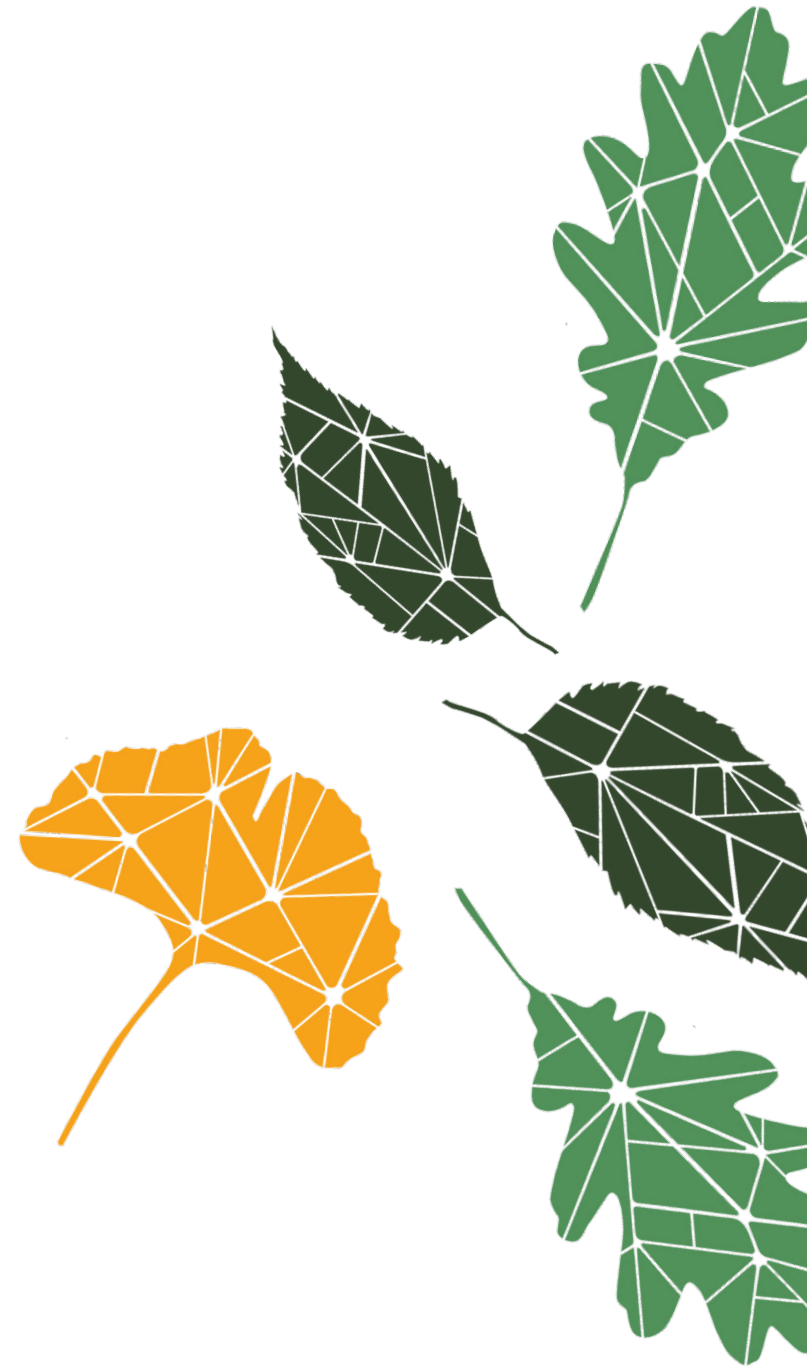
Presented by

Kathleen Wolf, University of Washington

Jennifer Egan, University of Maryland

Sagar Shah, American Planning Association

Medessa Buriem, University of Maryland



Nature & Health Translations to Planning

Sponsored by
USDA Forest Service



American Planning Association
University of Maryland, Environmental Finance Center
University of Washington, College of the Environment





Project Purpose

**to provide planning tools
that envision nature
as a comprehensive system
to promote public health
in cities**



Project Partners

- ✓ Dr. **Jennifer Egan & Medessa Burien**, MPH, University of Maryland, Environmental Finance Center
- ✓ Dr. **Sagar Shah**, AICP - Planning and Community Health Manager at American Planning Association
- ✓ Dr. **Kathleen Wolf** - University of Washington, Human Dimensions of Urban Forestry & Urban Greening





**2nd World Forum on
Urban Forests**

Washington DC, 2023

What is the Nature & Health evidence?

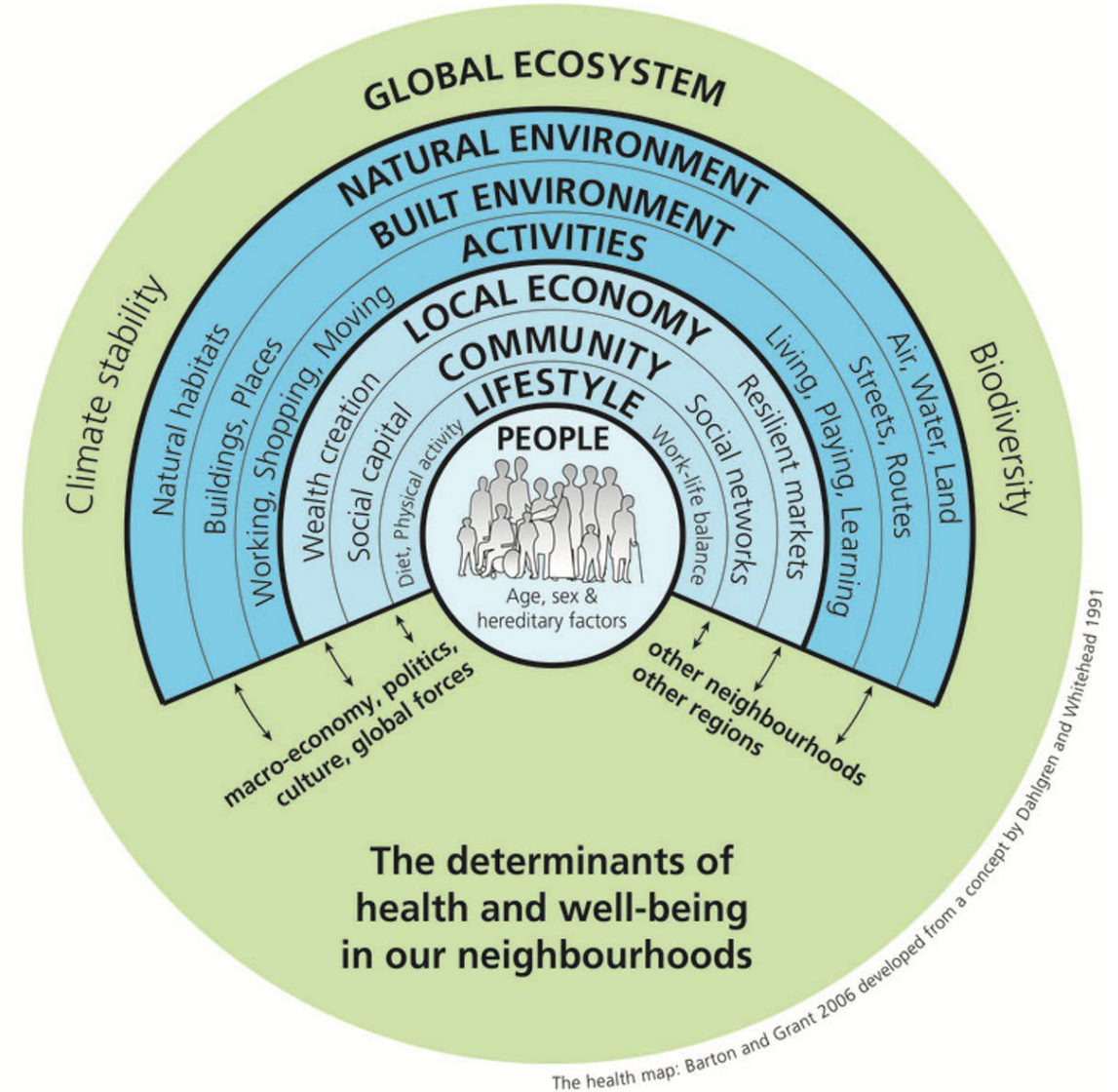


Social Determinants of Health

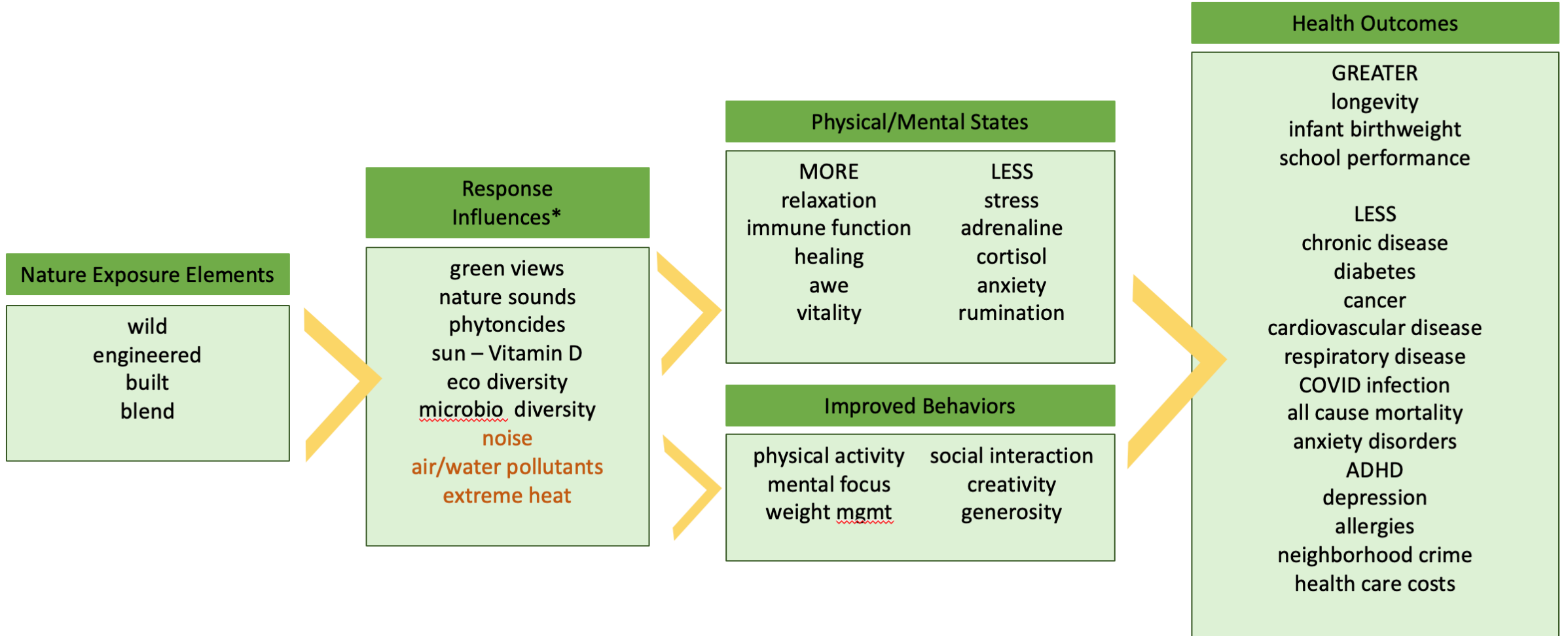
Health is...

A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity

(World Health Organization, 1946)



Summary of Current Evidence





What are the Nature Exposure elements?

a better term?



Nature Exposure Elements

Wild	Engineered	Built	Blend
natural area/reserve	street boulevard	courtyard	formal park
critical area	complete/green street	residential entries	community garden
floodplain	green roof	transit stations	food forests/orchard
riparian buffer	green wall	playground	waterfront
wetland	green stormwater		streetscape
shoreline	infrastructure		quasi-public grounds
	gray/brownfield		urban civic space
	remediation		green schoolyard

nature is not a luxury



US Forest Service



City of Chicago



The Guardian



Taylor Quality Guitars



Austin 2nd Street



Green Schooyards America



**THE Sustainable
SITES
Initiative®**





Nature-Based System in Cities & Communities?

equivalent to other city systems

Report & Training

I. Nature and Health: A Planning Issue

II. Nature and Health: In Communities

III. Cross-Sector Collaboration

IV. Indicators and Metrics



**2nd World Forum on
Urban Forests**

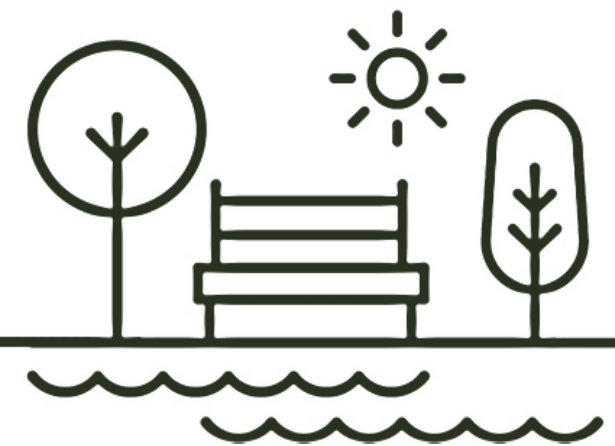
Washington DC, 2023

How to connect Nature & Health using Planning?






300m
FROM THE NEAREST PARK OR GREEN SPACE



perceptual linkages

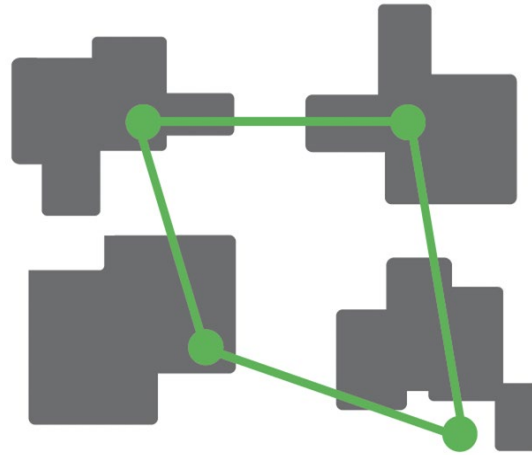
NEARBY NATURE
FOR HUMAN HEALTH
SITES TO
SYSTEMS



Nature Sacred

Wolf & Brinkley, 2016

Nested with Links



Fill in the Squares



Hub & Spoke

Planning Implementation & Interventions



Visioning & Goal Setting



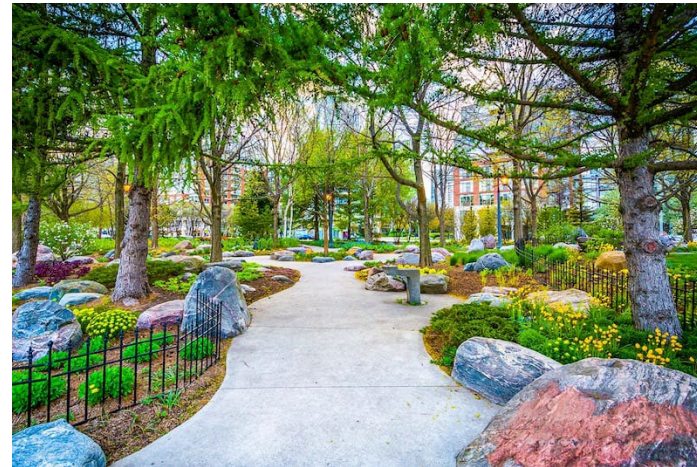
Plan Making



Regulatory Approaches



Incentives



Investments



Development



Do you have . . .

Examples or case studies of
planning for nature?

Examples of case studies of
physical planning
for mental health?





Thank you

Kathleen Wolf, University of Washington

✉ kwolf@uw.edu

Jennifer Egan, University of Maryland

✉ jegan@umd.edu



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



2nd **World** **Forum on** **Urban** **Forests**

2023



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

Washington DC, 2023

Fulfilling the promise of urban forestry:
How do we align site-level urban forest
management to achieve city-wide plans?



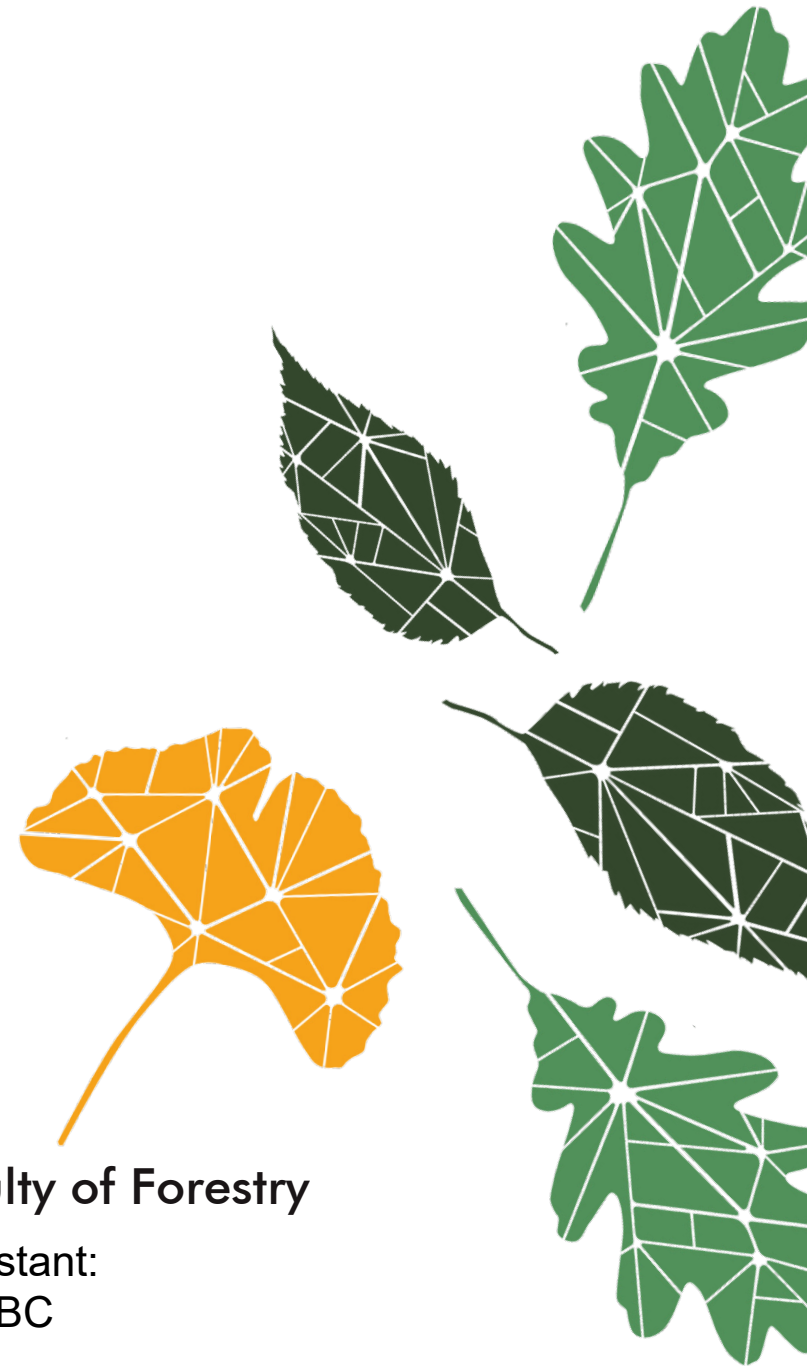
Presented by

Corinne (Corey) Bassett

PhD Candidate, University of British Columbia, Faculty of Forestry

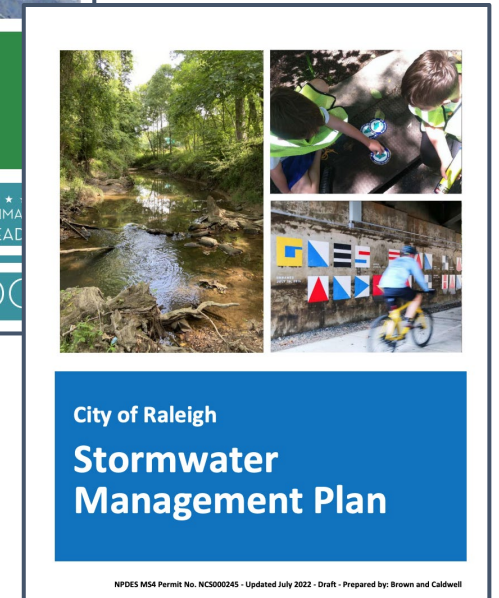
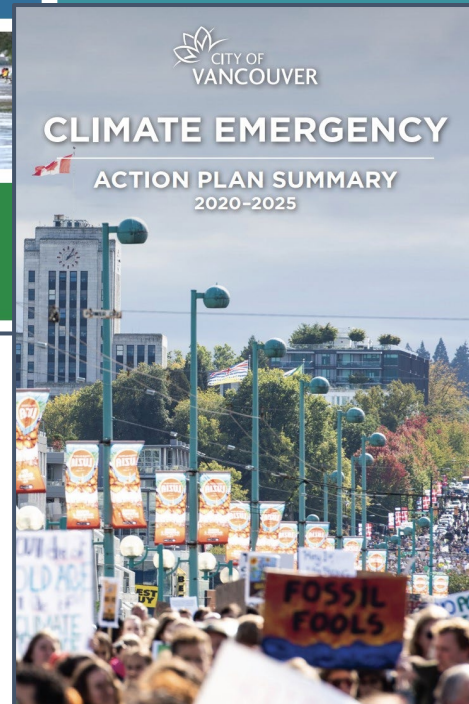
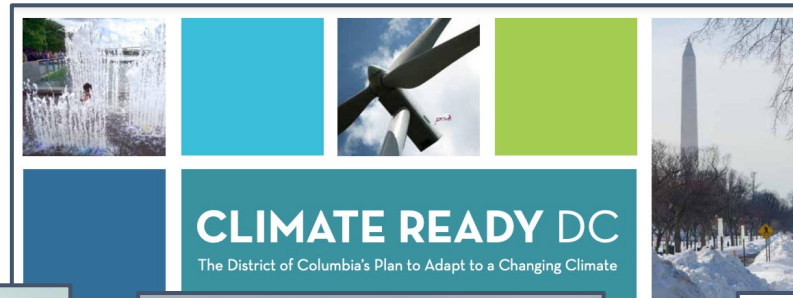
Co-authors: Dr. Susan Day, UBC
Dr. Cecil Konijnendijk, UBC & NBSI
Dr. Lara Roman, USDA Forest Service

Research Assistant:
Chanel Yee, UBC





1. Cities need to achieve their goals.



1. Cities need to achieve their goals.
2. Urban foresters make management decisions every day which prioritize certain benefits over others.

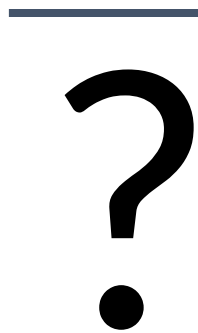




1. Cities need to achieve their goals.
2. Urban foresters make management decisions every day which prioritize certain benefits over others.

...are we aligning decisions with our cities' goals?

Aim

A collage of various city planning and climate resilience documents. The documents include:

- HEAT RESILIENCE SOLUTIONS FOR BOSTON**: A document with a blue background and a photograph of a fountain.
- CLIMATE READY DC**: A document with a teal background, titled "The District of Columbia's Plan to Adapt to a Changing Climate", featuring a photograph of a wind turbine and a snowy street.
- City of Raleigh Stormwater Management Plan**: A document with a blue background, featuring a photograph of a stream and a cyclist.
- Vancouver Bird Strategy**: A document with a white background, featuring a photograph of a bird on a post and a city skyline, dated January 2015 (Updated December 2020).

Street tree mgmt

City goals

Methods: Semi-structured interviews



- 20 cities in US (n=16) and Canada (n=4):
 - advanced UF programs
 - city plans with UFES goal

Pop.	<100K	100K-700K	>700K
East ↑ ↓ West	Watertown, NY	Hartford, CT	New York, NY
	Iowa City, IO	Ann Arbor, MI	Mississauga, ON
	Eau Claire, WI	Chattanooga, TN	Austin, TX
	Missoula, MT	Louisville, KY	Denver, CO
	Woodland, CA	Vaughan, ON	Seattle, WA
	Kirkland, WA	Kansas City, MO	
	Victoria, BC	Sacramento, CA	

Interview Participants



- Municipal employees
- Responsible for management decisions about street trees
 - ex. city forester, urban forestry supervisor, chief arborist, etc.
- Highly educated and trained
- Avg 20 years experience in urban forestry

Analysis & Results

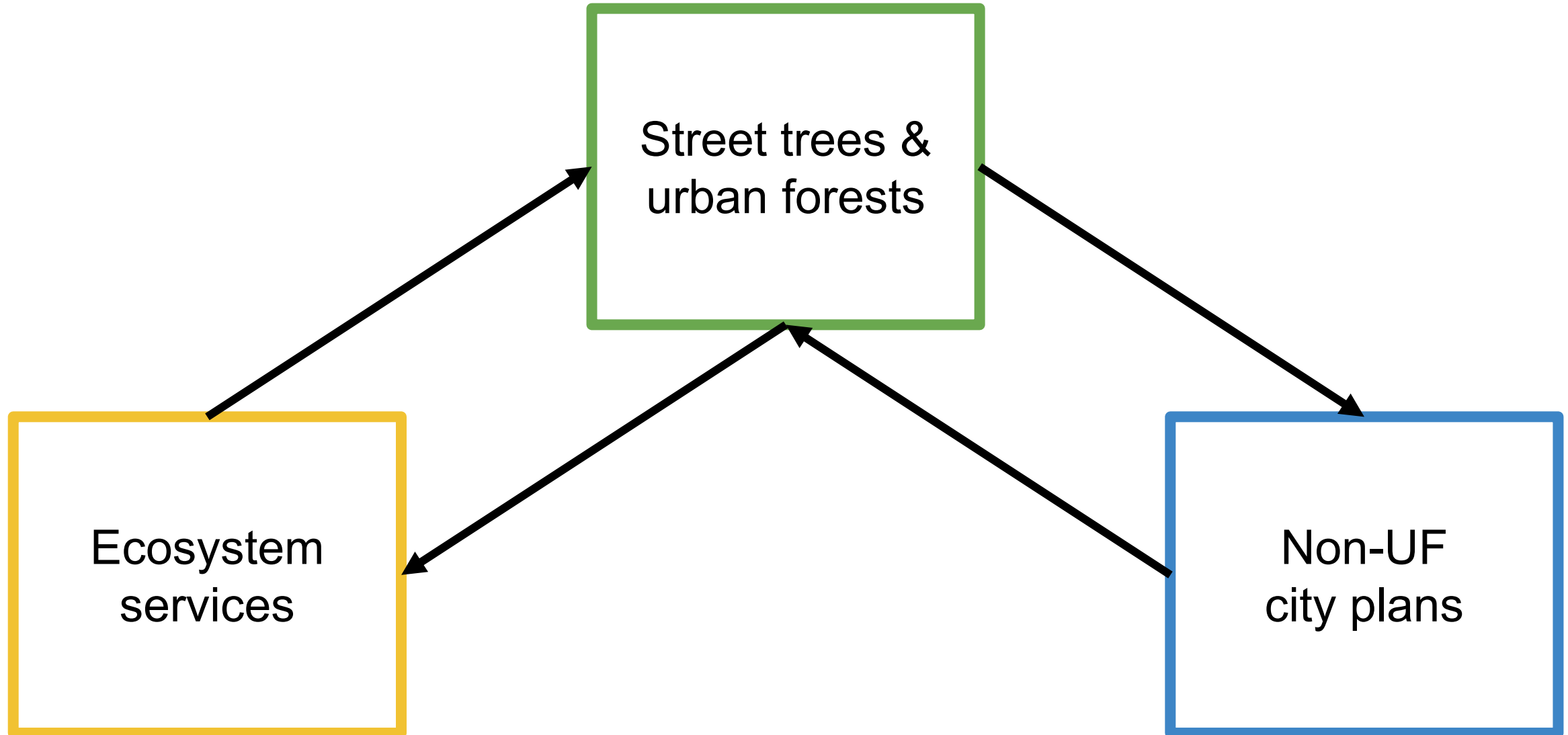


Results – Overall

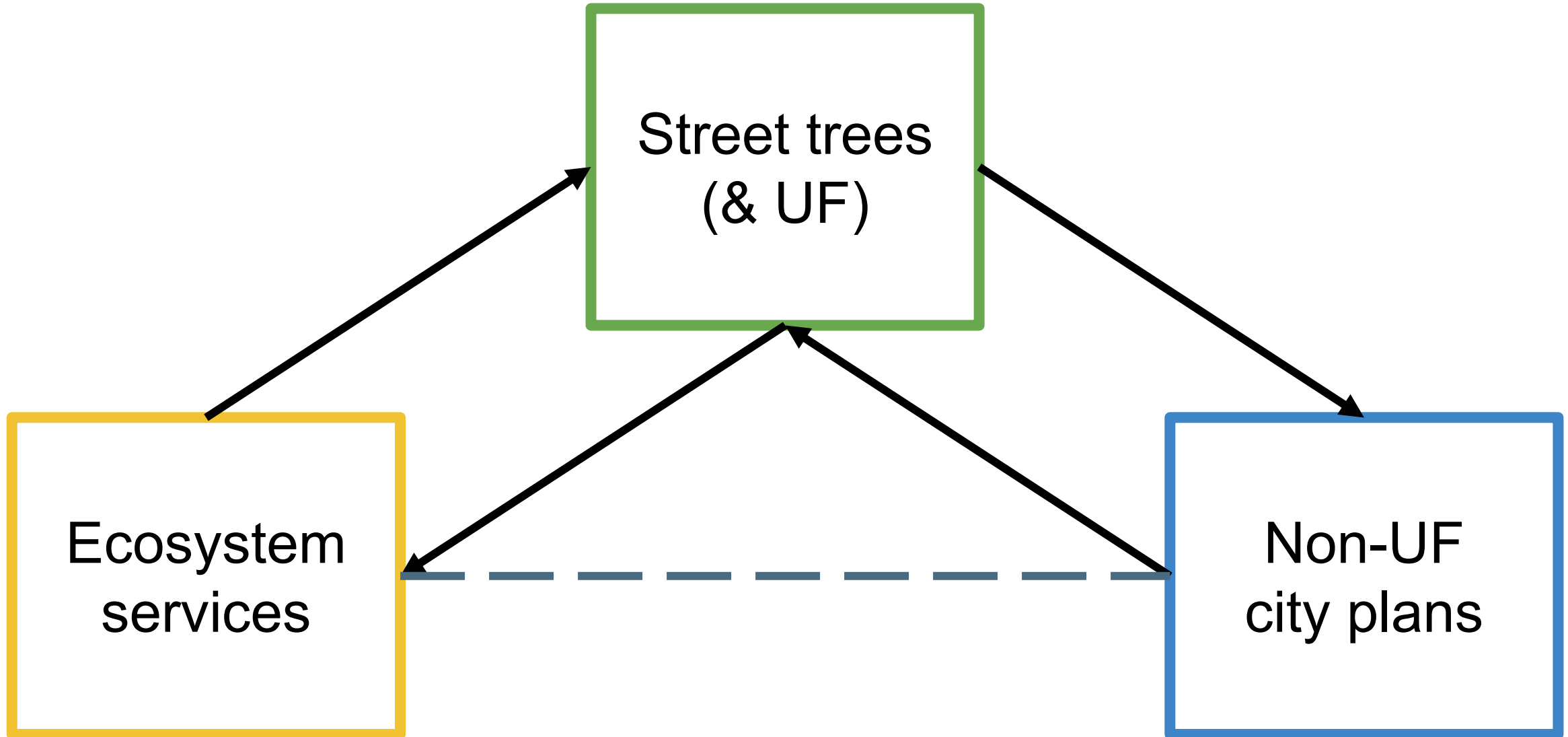


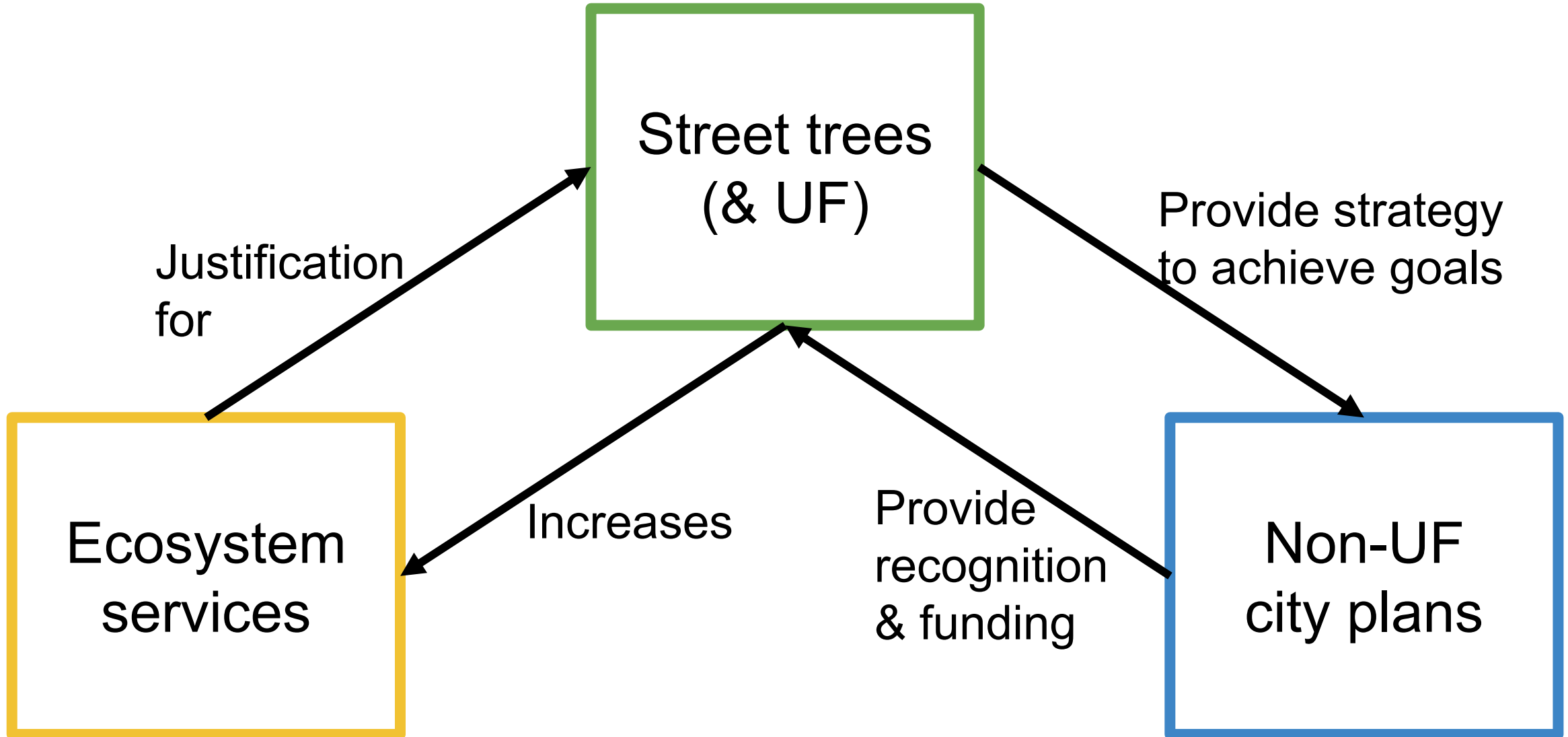
- Most important mgmt objectives:
 - Public safety
 - Customer service
 - Growing tree canopy
- Very familiar with concept of ESS
- Range in their perception of how aligned their programs were with non-UF city plans

Relationships between...

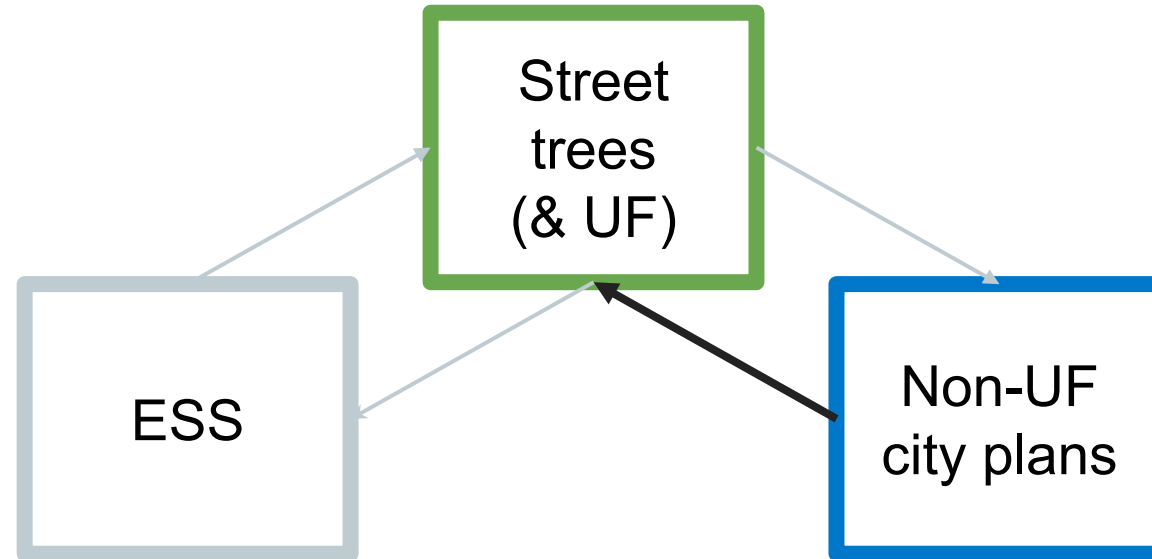


Relationships between...



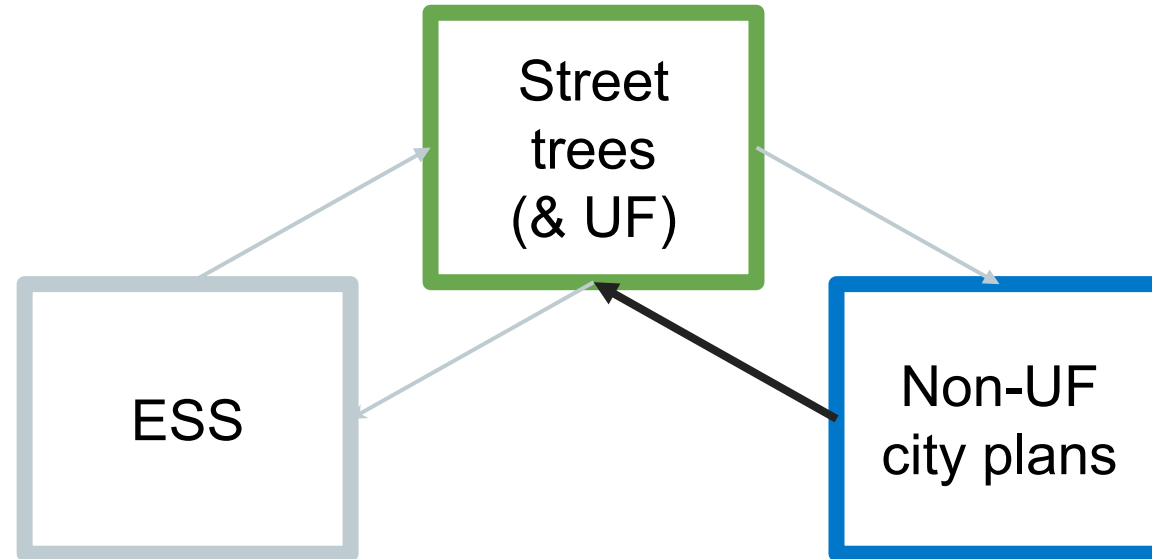


Emergent themes



- Flexible guide (n=8)
- Small influence on decisions (n=7)
- Source of recognition or support (n=8)

Emergent theme



“We do refer to the, you know, to the Climate Action Plan, [...] but, overall, like, from a day-to-day standpoint, it's just trying to get more trees in more spaces.” (P2)

Non-UF city plans as a “flexible guide”



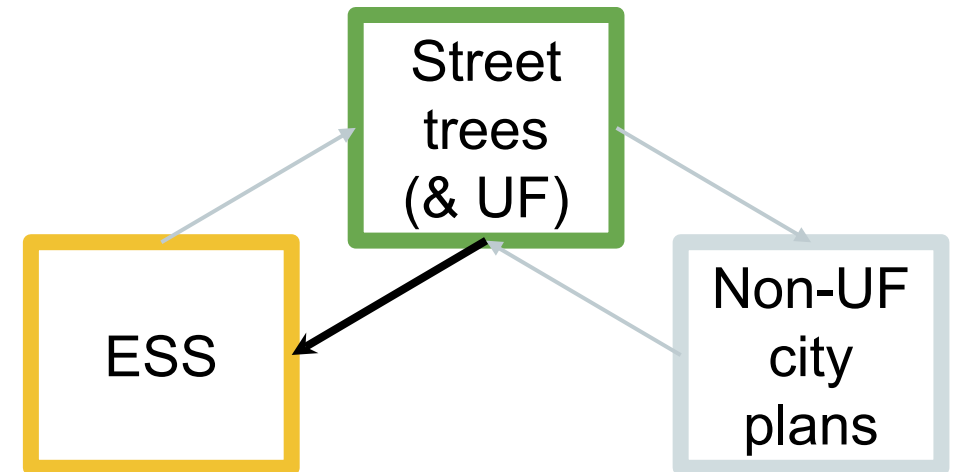
*“...I don't use them as my **Bible** [...] my focus is health of trees, health of the urban forest, you know, keeping what we have as long as we can [...] I think the benefit of that is, is providing what we need for those goals [...] **my goal is the forest, their goal is they want these things to happen. But I just use that as like guides**”*
(P20)

“[...] we will meet those goals where we can, but not spend a lot of energy trying to” (P19)

Emergent themes



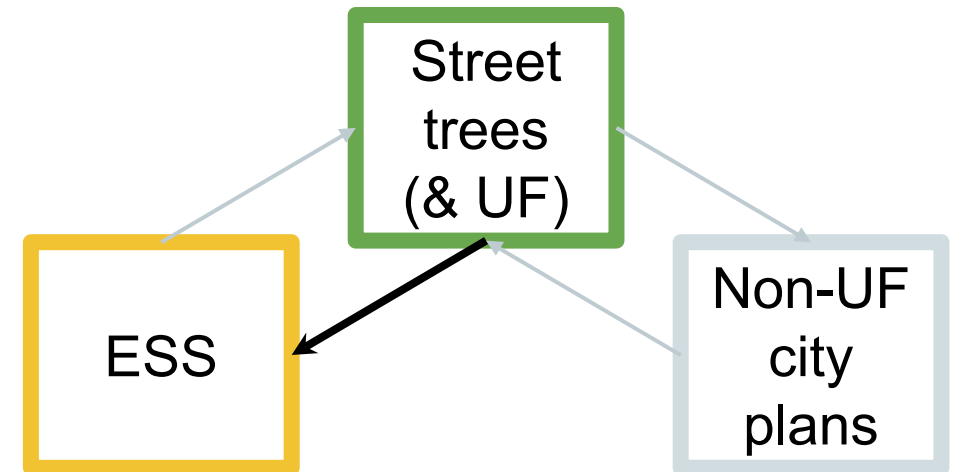
- More trees, more ESS (n=10)
- Larger trees, more ESS (n=12)
- Increase tree longevity, increase ESS (n=15)
- Improve urban forest health, benefits will come (n=14)



Emergent themes



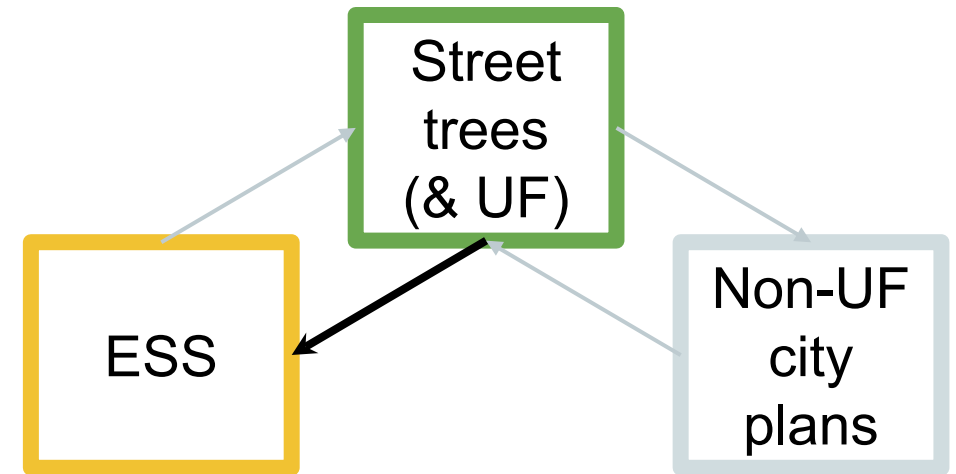
- More trees, more ESS (n=10)
- Larger trees, more ESS (n=12)
- Increase tree longevity, increase ESS (n=15)
- Improve urban forest health, benefits will come (n=14)
- **Specific UF types, different ESS (n=12)**
- **Mgmt choices can result in different ESS (n=8)**



Emergent themes



*“When I said I focus on **canopy coverage**, that's going to hit all the **climate** goals about **heat island effect**, about **stormwater retention**, about **habitat**. You know, it's gonna hit all those things. As much as possible.” (P19)*



Strategies to align street tree mgmt with city ESS goals



Align site design and species selection (n=18)

Strategy: Align site design and species selection



*“We try to **overlap goals**. So if we have a low-income area that is also stormwater susceptible, that will be a priority planting area.” (P11)*

“My overall goal would be more space for trees [...] but within that natural space, hey, let’s also design a way for water to be collected. (P20)”

*“First, it’s going back to GIS and like ‘hey, is this an area of high need of trees, based on all the factors, low canopy, **high urban heat, underserved** neighborhood?’” (P1)*

Strategies to align street tree mgmt with city ESS goals



Partnership with specialist organizations (n=11)

- Internal
 - Ex. water department
- External
 - Ex. food forest NGO, wildlife NGO

Strategy: Partnership with specialist organizations



- Internal
 - Ex. City water department
- External
 - Ex. food forest NGO, wildlife NGO

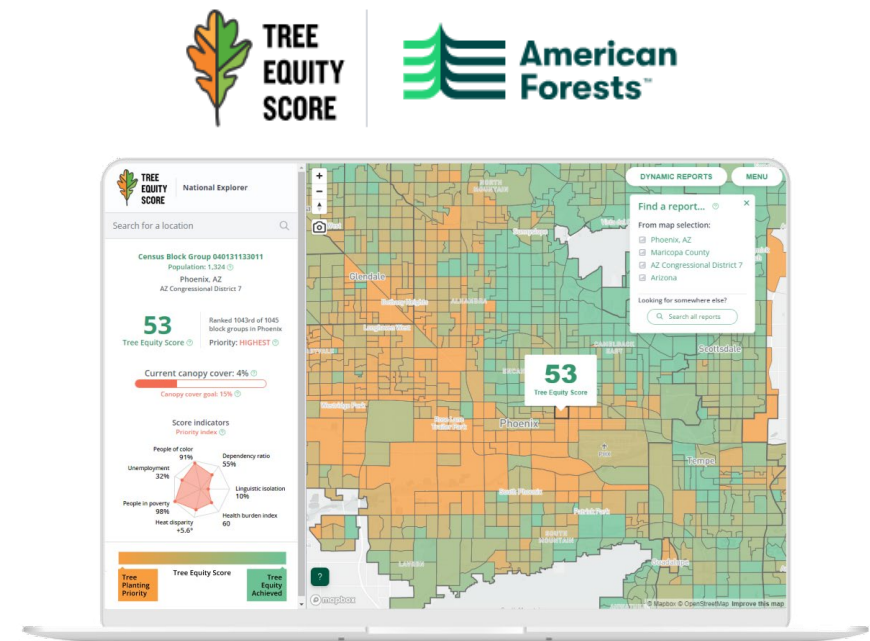
“We partner and support each other with the department of utilities who handle stormwater. [...] on one hand, I'm working with a tree, but I'm promoting a goal that is actually somebody else's goal.”
(P19)

Strategy: Partnership with specialist organizations



- Internal
 - Ex. City water department
- External
 - Ex. food forest NGO, wildlife NGO

**Partner organization
AND site alignment example:**





...are we aligning decisions with our cities' goals?

Sometimes!

Conclusions



- Public safety and resident requests are the top operational priorities for municipal urban foresters



Conclusions



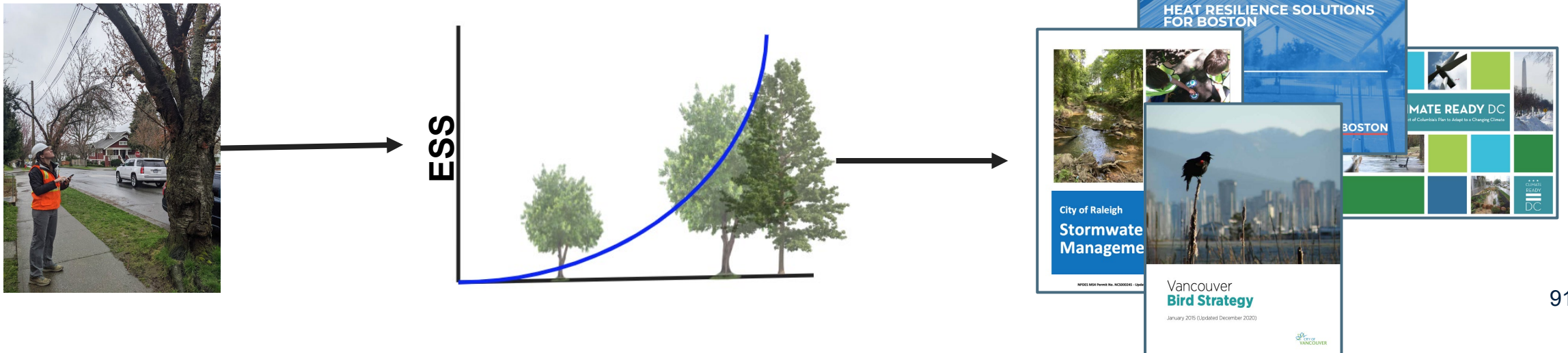
- Public safety and city resident requests are the top operational priorities for municipal urban foresters
- Urban forest management could be better aligned with non-UF city plans



Conclusions



- Public safety and city resident requests are the top operational priorities for municipal urban foresters
- Urban forest management could be better aligned with non-UF city plans
- Perceived alignment based on idea that increasing urban tree canopy will result in “more” ecosystem services, which will in turn contribute to city goals



...what's next?



Street Tree Futures

This research is funded in part by the Social Sciences and Humanities Research Council of Canada.



Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

Canada



Street Tree Futures

Thank you

Corey Bassett

University of British Columbia

 **cgbass@ student.ubc.ca**

This research is funded in part by the Social Sciences and Humanities Research Council of Canada.



Social Sciences and Humanities
Research Council of Canada

Conseil de recherches en
sciences humaines du Canada

Canada



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



POLITECNICO
MILANO 1863



ISA
International Society of Arboriculture



Smithsonian



FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

2nd **World** **Forum on** **Urban** **Forests**

2023



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

Washington DC, 2023

On tree-related microhabitats in urban areas



Presented by

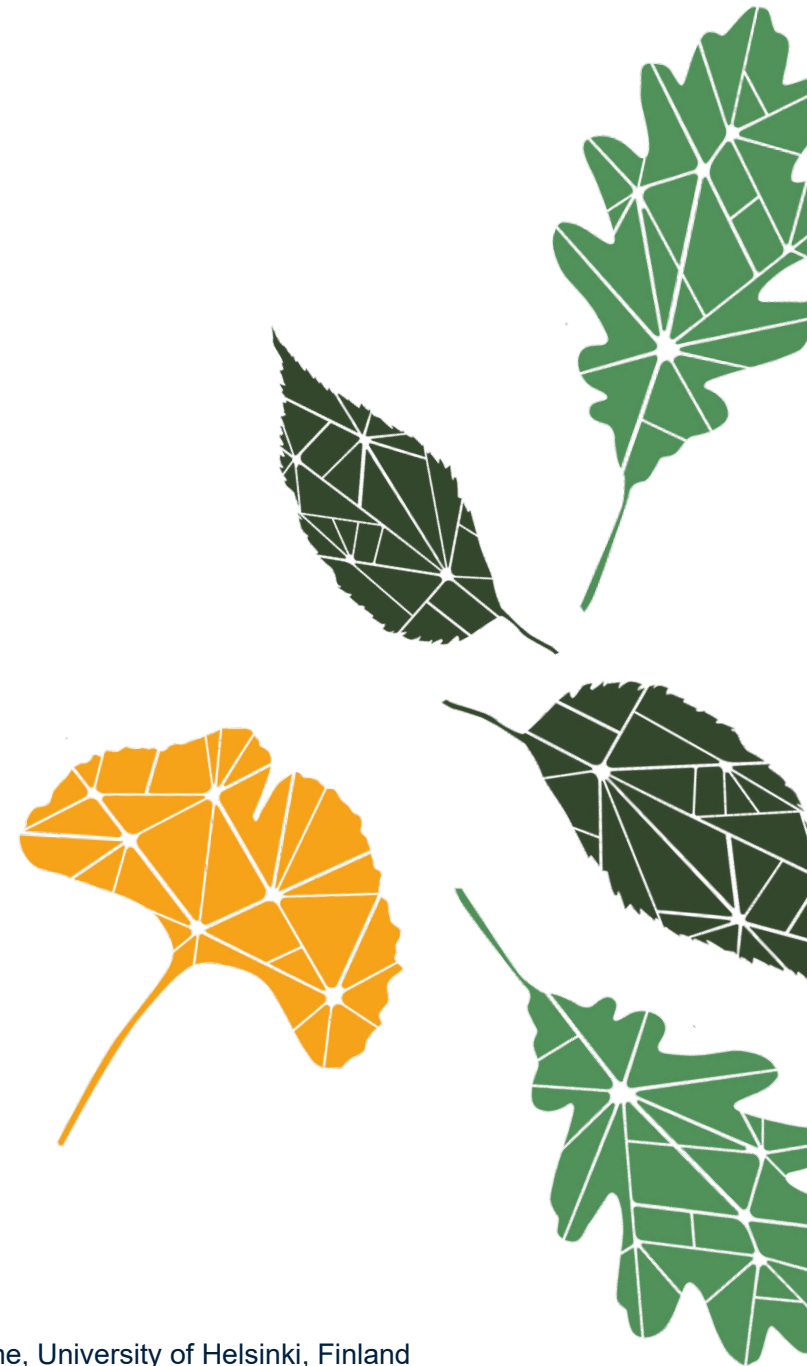
Thomas Campagnaro¹

Nicola Menon¹, Dina Cattaneo¹, D. Johan
Kotze², Yoan Paillet³, Paolo Semenzato¹

1. Department of Land, Environment, Agriculture and Forestry, Università degli Studi di Padova, Italy

2. Faculty of Biological and Environmental Sciences, Ecosystems and Environment Research Programme, University of Helsinki, Finland

3. INRAE, LESSEM, Université de Grenoble Alpes, France





Urban trees and forest are important for biodiversity

URBAN TREES ARE KEY TO GLOBAL BIODIVERSITY

Sustainable urban and peri-urban forestry contributes to ecosystem restoration and helps halt and reverse the loss of biodiversity.

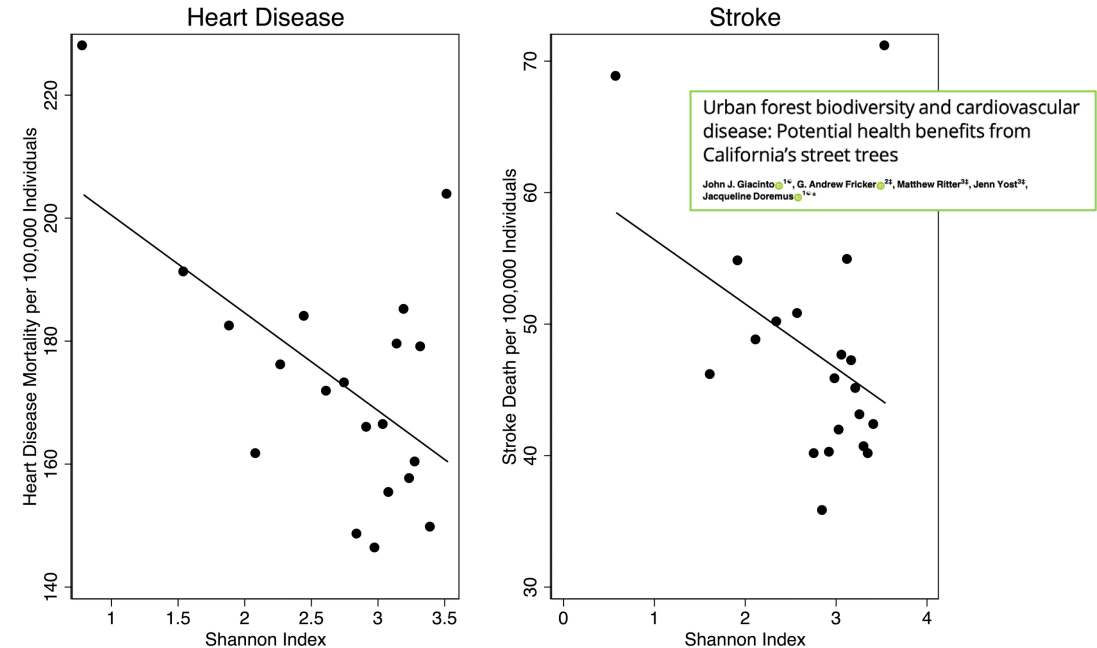


«Covering only 2% of land globally, cities are home to one-sixth of the world's tree diversity with urban forests composed of up to 10 billion trees, and more than 100 genera.»

https://unece.org/sites/default/files/2022-12/COP15_infographic_final.pdf



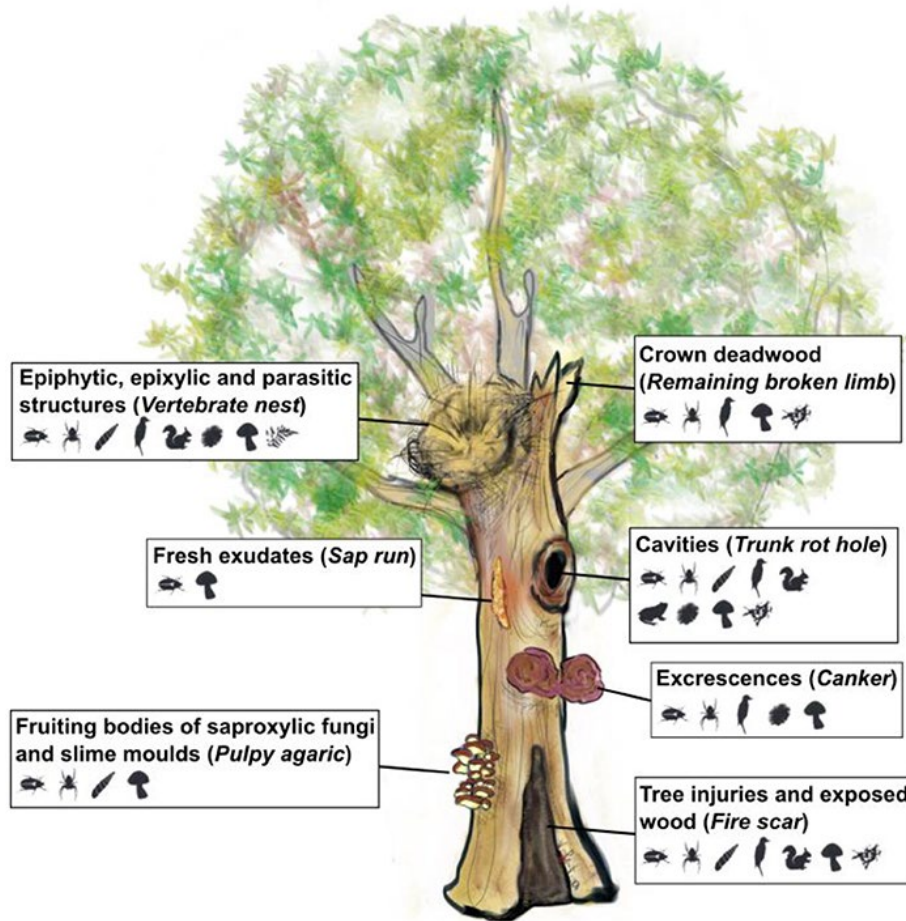
Conservation of many species of flora and fauna
Related benefits: environmental awareness, the mental health and well-being of citizens,...





Tree-related microhabitats (TreMs)

✓ “a distinct, well delineated structure occurring on living or standing dead trees that constitutes a particular and essential substrate or life site for species or species communities during at least a part of their life cycle to develop, feed, shelter or breed”



✓ The concept of TreMs “is an approach to assess and manage multi-taxon species richness in forest ecosystems”

- Insects
- Arachnids
- Gastropods
- Birds
- Mammals
- Amphibians & reptiles
- Bryophytes
- Fungi
- Lichens
- Vascular plants & ferns

Tree-Related Microhabitats Are Promising Yet Underused Tools for Biodiversity and Nature Conservation: A Systematic Review for International Perspectives

Maxence Martin^{1,2,3*}, Yoan Paillet⁴, Laurent Larrieu^{5,6}, Christel C. Kern⁷, Patricia Raymond^{1,4}, Pierre Drapeau^{1,4} and Nicole J. Fenton^{1,3}



Tree related microhabitats in temperate and Mediterranean European forests: A hierarchical typology for inventory standardization
Laurent Larrieu^{1,2,3,4,5,6,7,8}, Yoan Paillet^{4,5}, Susanne Winter^{4,5}, Rita Büttler^{4,5}, Daniel Kraus⁴, Frank Krumm⁴, Thibault Lachat^{4,5}, Alexa K. Michel⁴, Baptiste Regnier^{4,5}, Kris Vandekerckhove⁴



The Use of Tree-Related Microhabitats as Forest Biodiversity Indicators and to Guide Integrated Forest Management

Thomas Asbeck¹, Josef Großmann^{1,2}, Yoan Paillet³, Nathalie Winiger⁴, Jürgen Bauhus¹



Tree-related microhabitats some examples



ph: T. Campagnaro



ph: T. Campagnaro



ph: T. Campagnaro



ph: T. Campagnaro



ph: T. Campagnaro



Food and Agriculture
Organization of the
United Nations

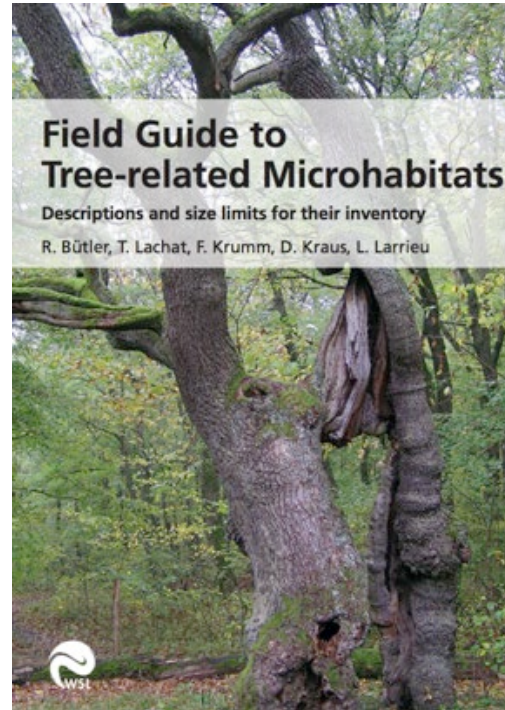


Arbor Day
Foundation






Surveying tree-related microhabitats



Cavities

Woodpecker breeding cavities


Small woodpecker breeding cavity ($\varnothing < 4$ cm)
Woodpecker breeding cavity with a round entrance < 4 cm in diameter. Lesser Spotted Woodpecker cavities are generally found in dead tree branches.



Minimum size: Cavity entrance $\varnothing < 4$ cm

Frequency: rare




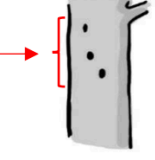
Replacement rate: fairly rapid

Associated species: 

Did you know? In natural temperate forests, cavity density ranges from approximately 5 to 60 per hectare. In Central Europe, around 35% of forest birds nest in cavities.

12

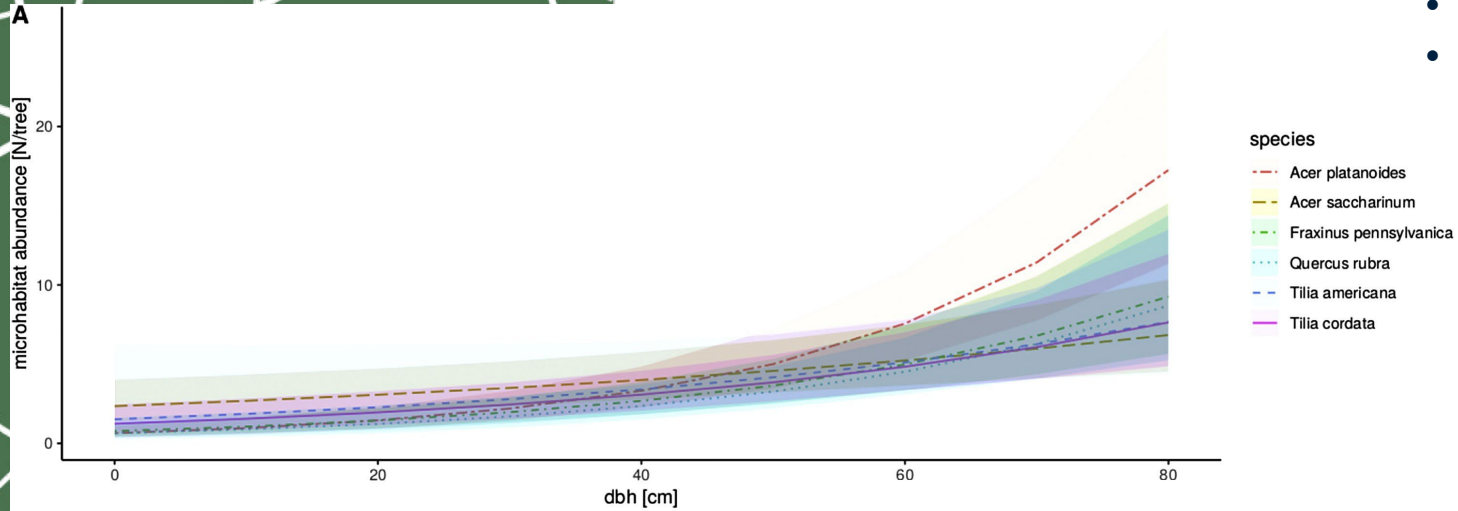
- Existing protocols
- Possible adaptations of the categories
 - exposed wood due to pruning (due to human interventions)
- Bias (i.e., view from below)

Woodpecker breeding cavities	Small woodpecker breeding cavity ($\varnothing < 4$ cm)	Medium-sized woodpecker breeding cavity ($\varnothing = 4-7$ cm)	Large woodpecker breeding cavity ($\varnothing > 10$ cm)	Woodpecker "Flute" (≥ 3 cavities on one line) ($\varnothing > 3$ cm)
CV1				
	CV11	CV12	CV13	CV14



What do we know of urban TreMs

- Several studies on specific TreMs (i.e. cavities)
- Few dealing with multiple TreMs
 - Increasing TreMs with increasing DBH
 - Increasing TreMs with management intensity
 - Differences between tree species



EFUF 2023 · URBAN FORESTS AS NATURE-BASED SOLUTIONS · Book of Abstracts

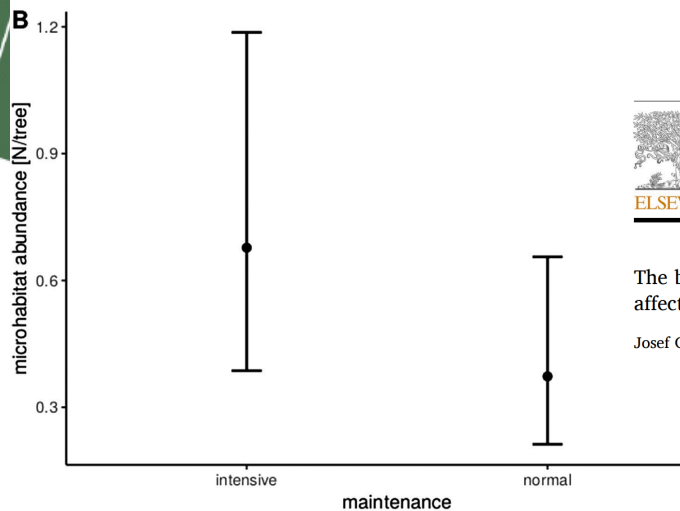
Microhabitat richness and abundance varied between species origin (exotic vs. native), size, growing environment (park vs. street), and crown management intensity: a study on four species from the city of Karlsruhe, southwest Germany

Saha, Somidh | Institute for Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (Germany), somidh.saha@kit.edu

Petridis, Zoe | Institute for Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (Germany)

Schmidtlein, Sebastian | Institute of Geography and Geoecology (IfGG), Karlsruhe Institute of Technology (KIT) (Germany)

Köhler, Mario | Horticulture Department of Karlsruhe City (Gartenbauamt), Karlsruhe (Germany)



The benefits of tree wounds: Microhabitat development in urban trees as affected by intensive tree maintenance

Josef Großmann^{a,b,*}, Patrick Pyttel^a, Jürgen Bauhus^a, Bastien Lecigne^c, Christian Messier^c



EFUF 2022

Adaptive Measures in Urban Forests

Urban Forest Techniques

Tree-related microhabitats in urban areas: preliminary results from urban parks in Padova (Italy)

Thomas Campagnaro^a, Yoan Paillet^b, Dina Cattaneo^a and Paolo Semenzato^a

^aInstitution: ^aDept. of Land, Environment, Agriculture and Forestry - Università degli Studi di Padova (Italy);

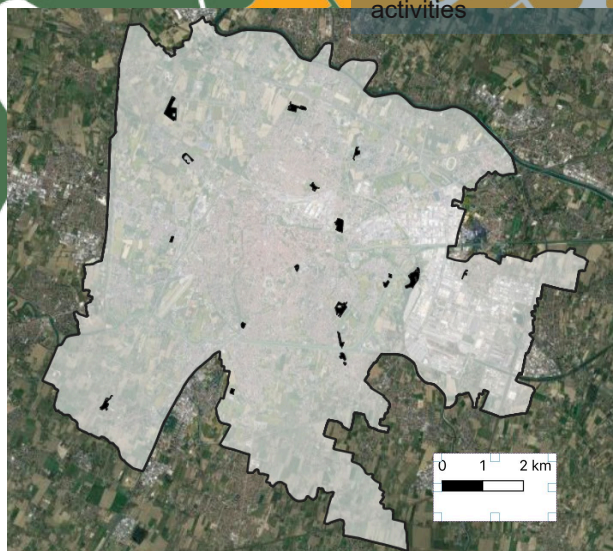
^bUniv. Grenoble Alpes, INRAE, Lessem, F-38402 Saint Martin d'Hères (France)

TreMs in urban parks (Padova - Italy)

17 urban parks

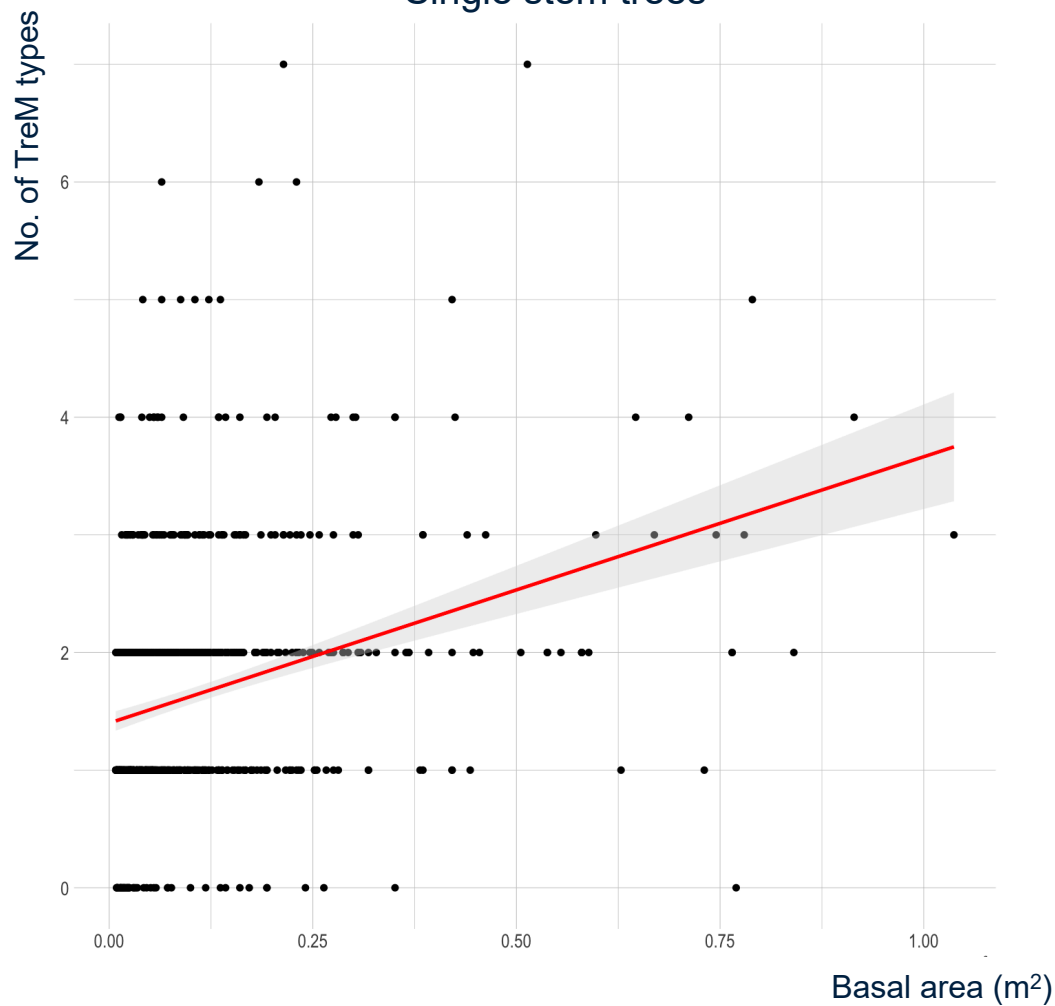
- 20% of trees per park surveyed
- 943 trees
 - 810 single stem trees

We thank Alberto Ferrante and Ramona Pricop for support in field activities

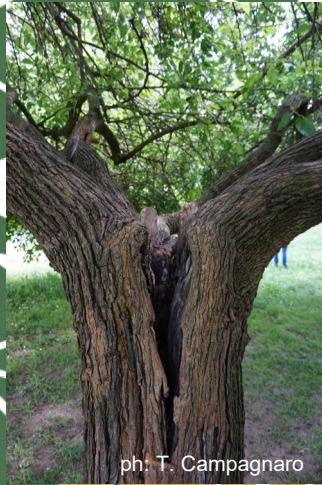


d.

Single stem trees

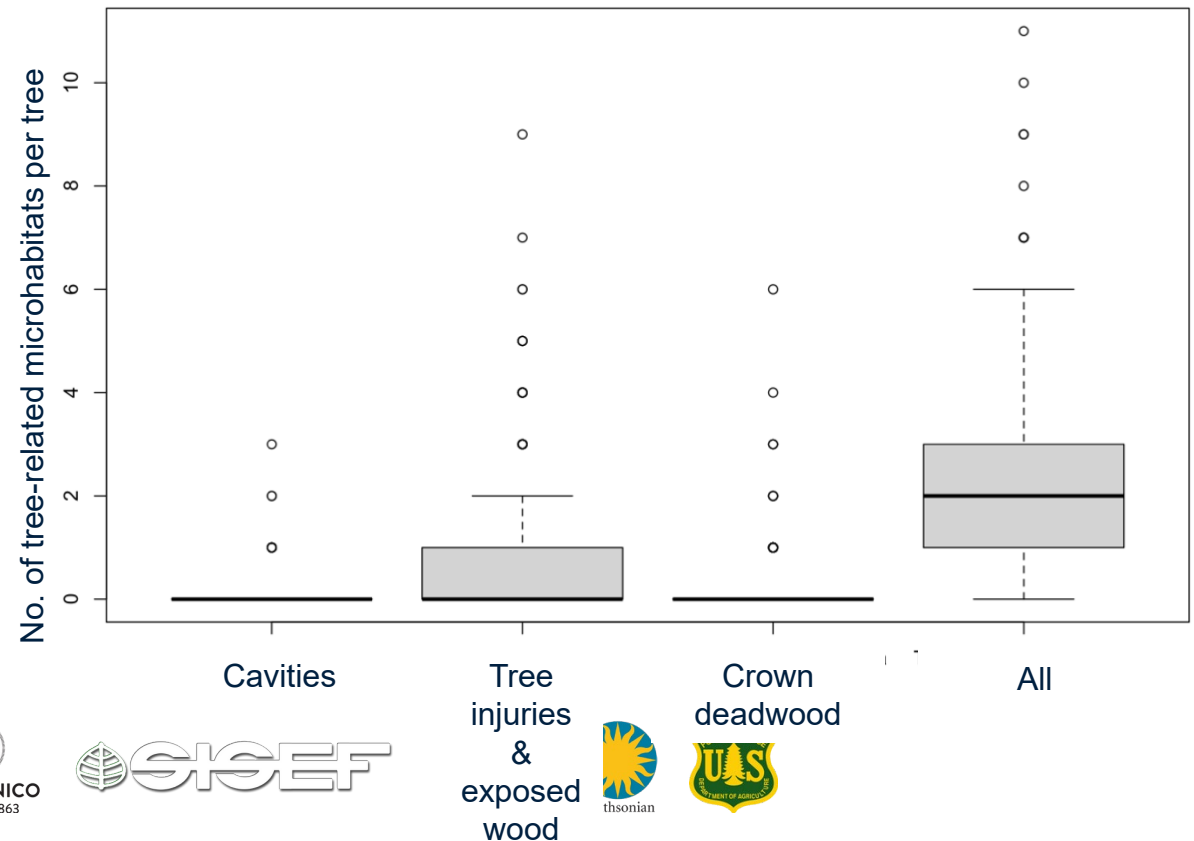


TreMs in urban parks (Padova - Italy)



Frequency of different TreMs types:

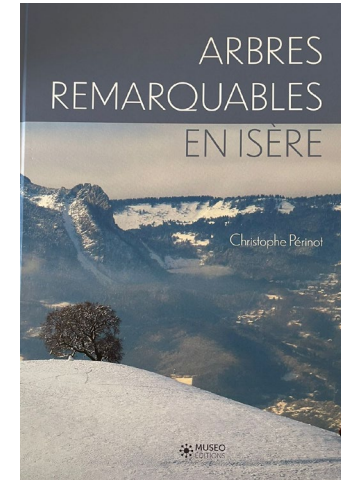
- 81% of trees with mosses/lichens
- 26% of trees with exposed wood due to cuts
- 16% of trees with ivy & lianas
- 13% of trees with invertebrate nests



“Important” trees in Grenoble (France)

Different types of tree:

- Monumental from experts (citizen science) [FO, MO, FA]
- Identified in urban planning regulations [IE, IL]



Protocole de relevé des arbres remarquables

- Identification précise de l'espèce
- Positionnement au GPS
- Prise de photos (les photos sont importantes pour suivre l'évolution sanitaire des arbres)
- Mesure de la **circonférence** à 1,30 m de hauteur (selon la morphologie de l'arbre, d'autres mesures de circonférence peuvent être complétées)
- Mesure de la **hauteur** au dendromètre (à visée optique ou électronique)
- Description de son **environnement**
- Relevé de l'**âge** ou d'une histoire associée
- Relevé de son **état sanitaire** basé sur un diagnostic visuel avec l'attribution d'une note de 0 (faible) à 5 (forte santé)
- Attribution d'une note globale de **remarquabilité** de 1 (faible) à 3 (forte), avec une classe supplémentaire pour les arbres hors du commun. Cette note est attribuée en se basant sur les critères relevés et par comparaison avec les résultats déjà enregistrés dans la base de données.

Végétation : Arbres isolés, groupes d'arbres, haies, ripisylves, secteurs particuliers (boisement, sites paysagers remarquables, etc.)	Protection d'éléments remarquables	L. 123-1.7	<ul style="list-style-type: none"> • article 2 : tous travaux ayant pour effet de détruire un élément de paysage identifiés par le PLU au titre de l'article L.123-1.7 doivent faire l'objet d'une autorisation préalable au titre des installations et travaux divers • article 13 : espace boisé classé • article 13 : les plantations existantes sont maintenues ou remplacées par des plantations d'essences équivalentes.
	Création d'EBC	L. 130-1	<ul style="list-style-type: none"> • article 13 : les espèces végétales seront choisies de préférence dans la liste figurant en annexe du présent règlement, ou interdiction d'utiliser certaines espèces. Aspect et typologie. • EBC à créer, signalé sur le document graphique de la même manière que les EBC existants

- Both previous categories [CC=FO or MO + IE or IL]

- Old trees (>70 ys) [O...]

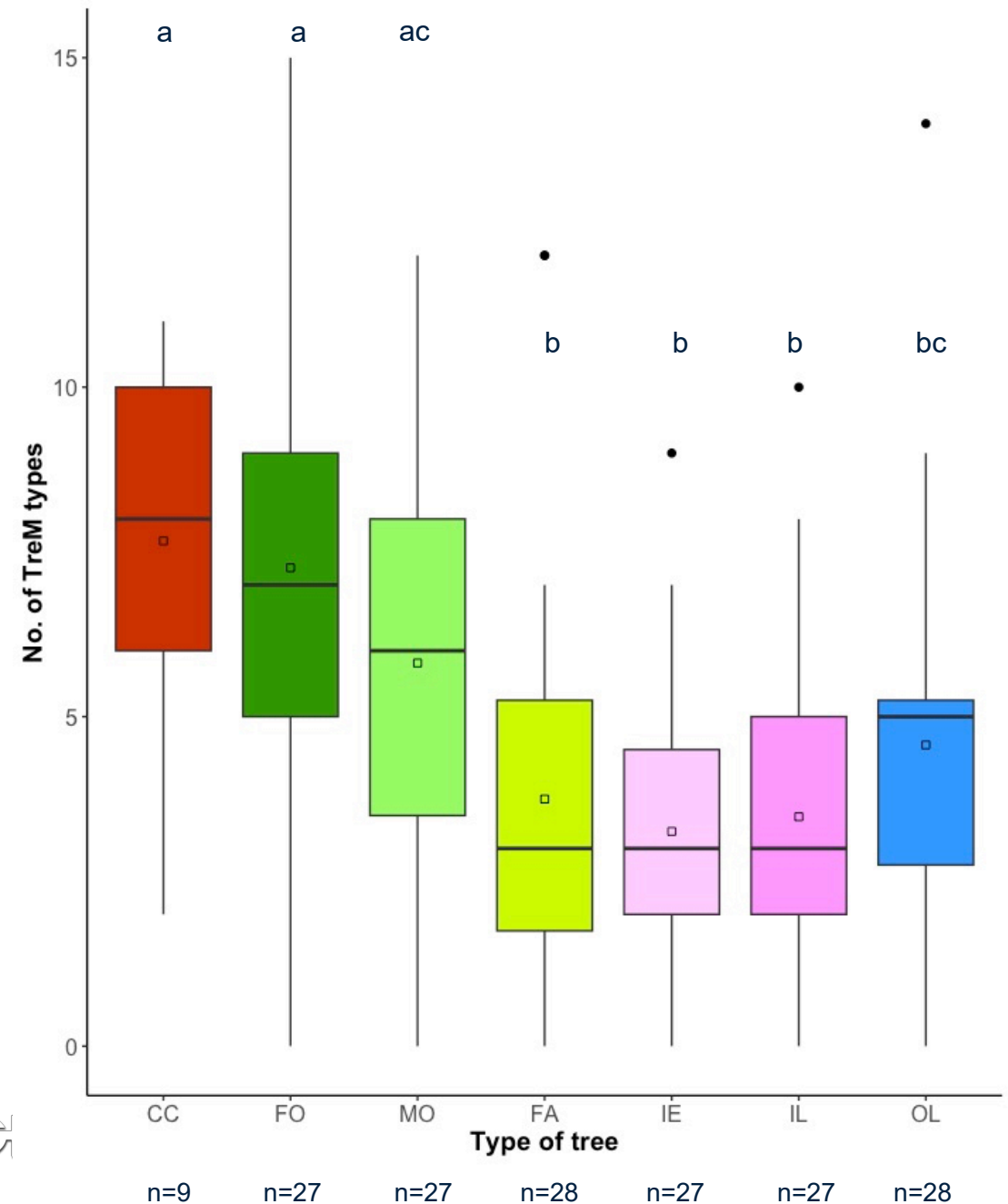


“Important” trees in Grenoble (France)

- 173 trees of which 156 have a single stem
- Similar results when considering only single stem trees

Tree species

- CC: 9 species
- FO: 23 species (most freq. = *Populus nigra*, n. 3)
- MO: 23 species (most freq. = *P. nigra*, n. 4)
- FA: 25 species
- IE: 10 species (most freq. = *Aesculus hippocastanum* & *Platanus acerifolia*, both n. 6)
- IL: 5 species (63% are *P. acerifolia*)
- OL: 8 species (50% are *P. acerifolia*)



Different types of tree:

- Monumental from experts (citizen science) [FO, MO, FA]
- Identified in urban planning regulations [IE, IL]
- Both previous categories [CC=FO or MO + IE or IL]
- Old trees (>70 ys) [OL]

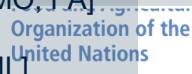
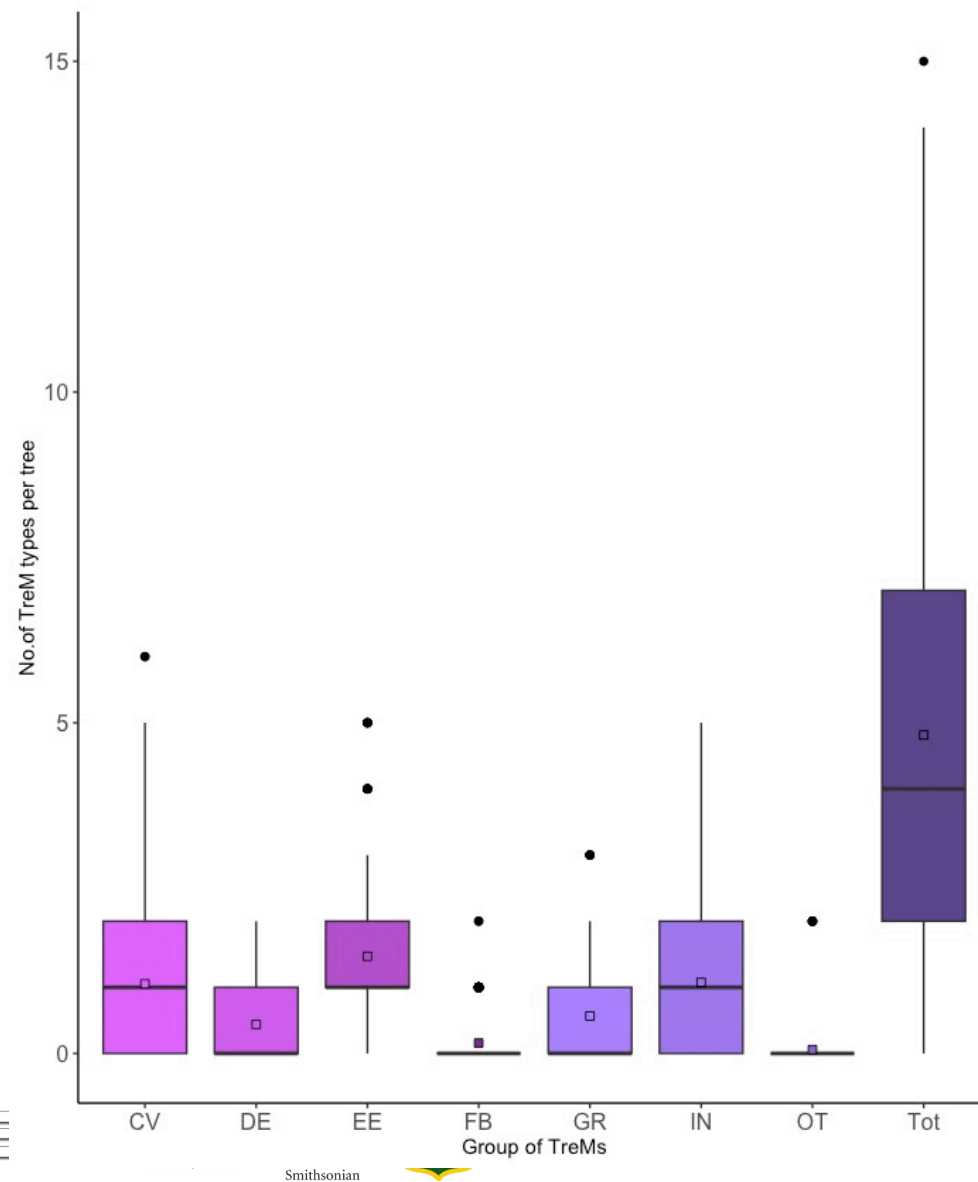


“Important” trees in Grenoble (France)

Type of TreM	Total (n=173)	CC (n=9)	FO (n=27)	MO (n=27)	FA (n=28)	IE (n=27)	IL (n=27)	OL (n=28)
Cavities (CV)	51.45 %	67%	78%	52%	21%	37%	52%	64%
Tree injuries & exposed wood (IN)	61.27 %	67%	82%	74%	57%	41%	63%	50%
Crown deadwood (DE)	38.73 %	67%	52%	48%	36%	37%	22%	29%
Excrescences (GR)	45.67 %	67%	48%	48%	25%	22%	52%	71%
Fruiting bodies (FB)	14.45 %	33%	22%	11%	4%	7%	22%	14%
Epiphytic & epixylic structures (EE)	75.72 %	100%	93%	82%	68%	70%	52%	82%
Exudates (OT)	2.89 %	0%	7%	7%	0%	0%	0%	4%

Different types of tree:

- Monumental from experts (citizen science) [FO, MO, FA]
- Identified in urban planning regulations [IE, IL]
- Both previous categories [CC=FO or MO + IE or IL]
- Old trees (>70 ys) [OL]





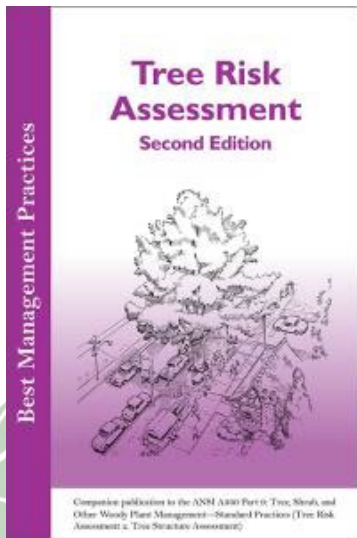
Planning and management

Possible “conflicts”

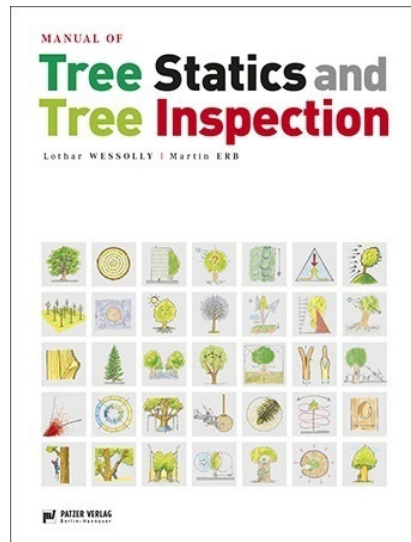
Increasing attention by public administrations & private sector

- Interest by specialists

- ✓ Application of specific interventions, for example « Coronet cuts »



<https://www.arborday.org/trees/bulletins/coordinators/resources/pdfs/015.pdf>



ph: Nicola Menon

ph: Nicola Menon



Lettre de l'arboriculture SFA n°113.



Conclusion

Variety of TreMs in urban areas = potential for biodiversity
Not all trees are equal for TreMs
Consider appropriate management & planning
Need of capacity-building & citizen awareness





Thank you

Thomas Campagnaro

Universita degli Studi di Padova

Dept. of Land, Environment, Agriculture and Forestry

 **thomas.campagnaro@ unipd.it**

We would like to thank **Ciro Degl’Innocenti** (Comune di Padova), **Louise Brunier**, **Anne-Sophie Mellet-Breton**, **Christophe Périnot** and **Fanny Reymond** (Ville de Grenoble) for their support

“Project financed with BIRD 2022 funds, Dept. TESAF, University of Padua – Italy”



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



2nd **World** **Forum on** **Urban** **Forests**

2023



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

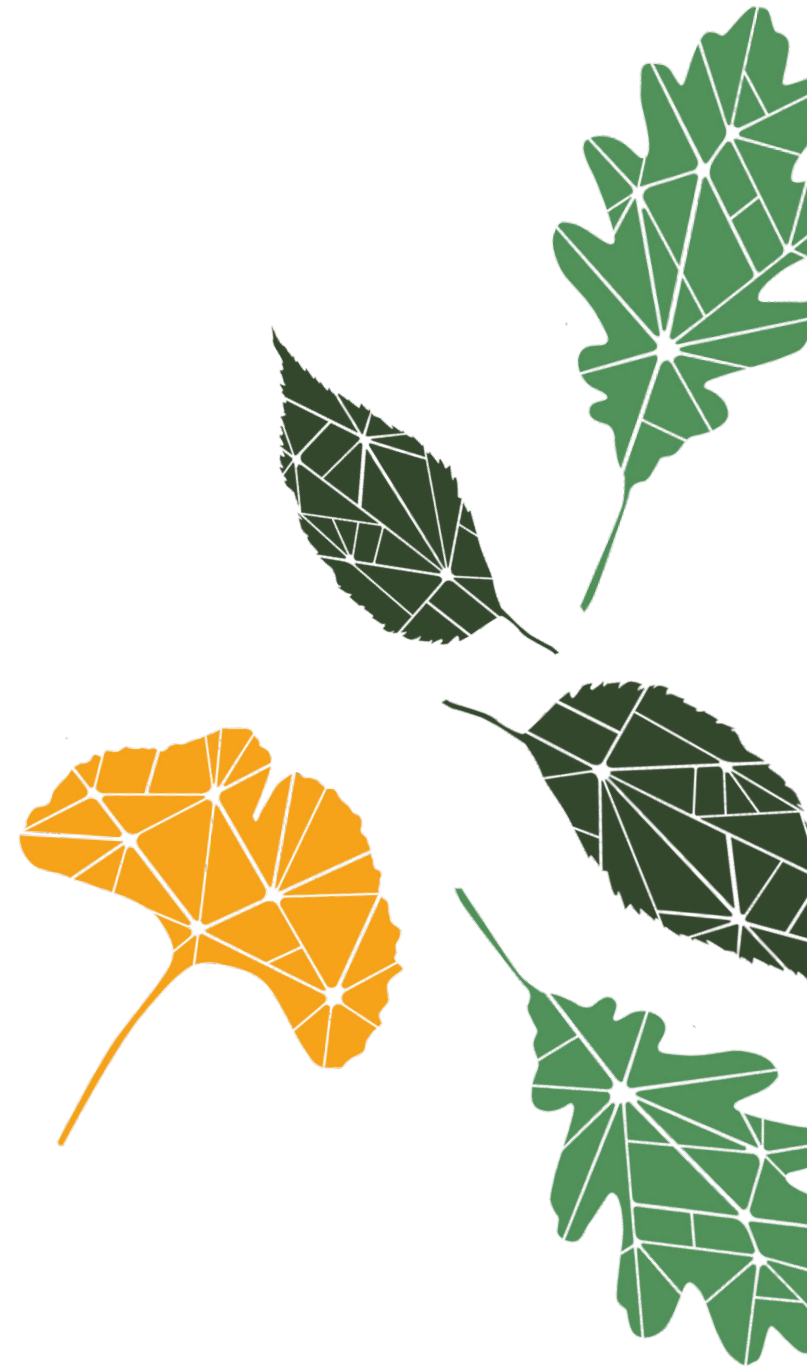
Washington DC, 2023

Bogotá's pruning plan, an essential
planning and governance instrument



Presented by

Germán Tovar Corzo
gtcorzo@yahoo.com



Bogota's pruning plan, an essential planning and governance instrument

SITUATIONS PRESENTED IN THE PAST WITH PRUNING IN BOGOTA'S URBAN TREES

- The commercial aspect (tree pruning contracts) was prioritized over the real need for tree pruning
- Lack of technical criteria to define the appropriate pruning
- Double intervention by different local government entities - Lack of coordination
- Scheduling and carrying out unnecessary pruning due to political or community pressure
- Deterioration of the physical and sanitary state of the trees.
- Large number of requests to the local government that can cause administrative collapse.
- Waste of logistical, technical and economic resources of the local government in the maintenance of urban tree cover
- Undefined maintenance costs for pruning



Bogota's pruning plan, an essential planning and governance instrument

OBJECTIVE 1

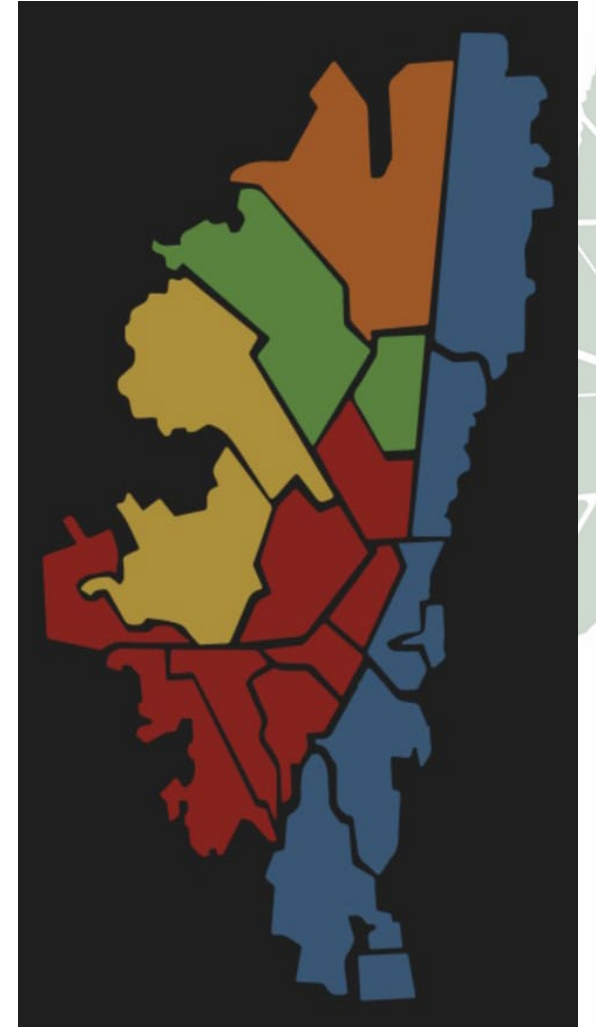
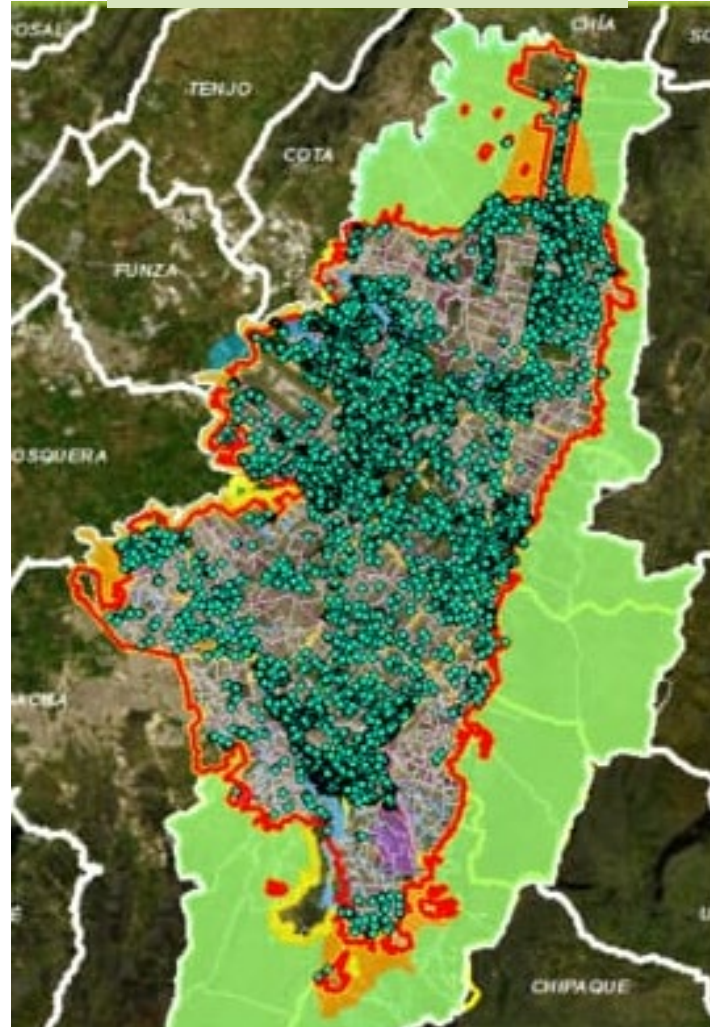
Prioritize the technical criteria to define the appropriate treatment according to the need for pruning of each urban tree

- Conformation of structurally strong trees, with a single dominant stem, balanced crown and branches with strong unions.

Pruning Plan must contain at least

- Pruning Type Training (Height control, raising and thinning), forming (structure and sanitary) and balance.
- Pruning intensity
- Pruning cycle
- Trees' census analysis in aspects related present species, zoning of the area by presence of species, number of individuals (universe per area), sizes, heights, physical and crown and trunk health status

1.189.643 urban trees





Bogota's pruning plan, an essential planning and governance instrument

OBJECTIVE 1

Prioritize the technical criteria to define the appropriate treatment according to the need for pruning of each urban tree

Pruning Plan must contain at least

- Trees' census analysis in aspects related present species, zoning of the area by presence of species, number of individuals (universe per area), sizes, heights, physical and crown and trunk health status
- Historical data analysis performance of pruning by area

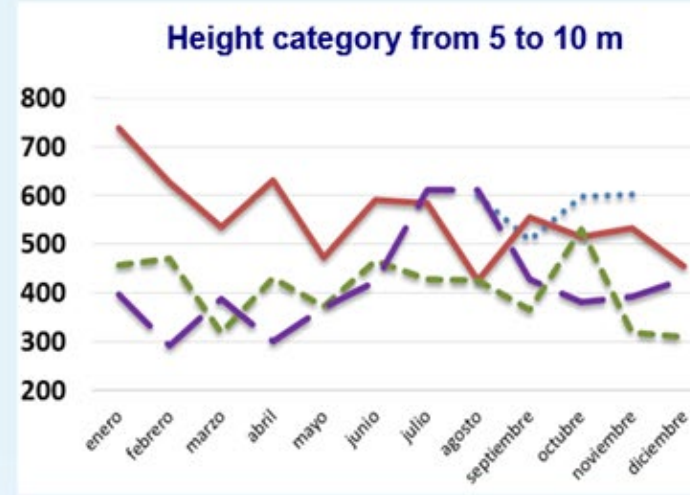
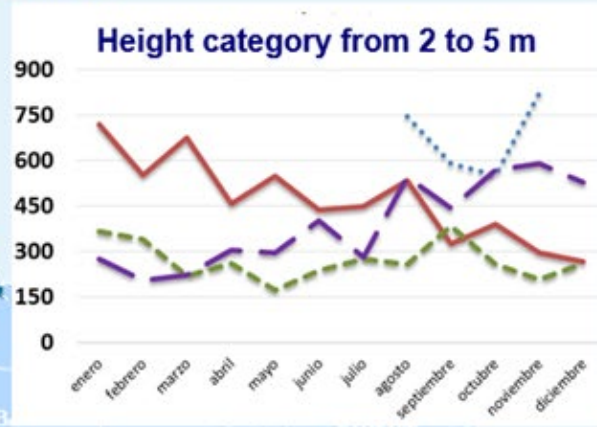




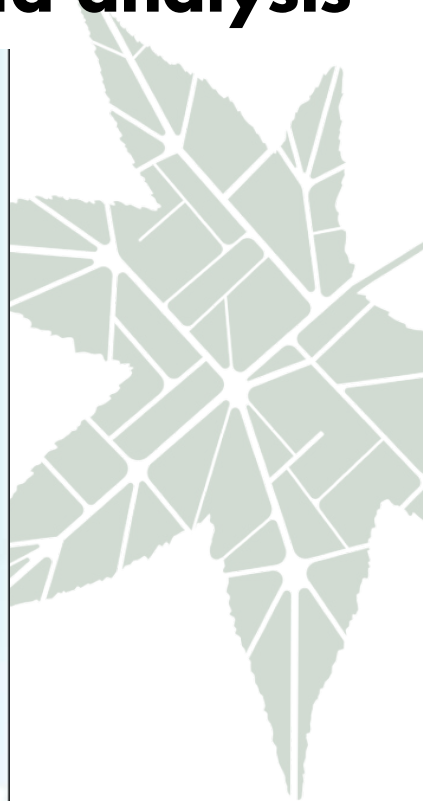
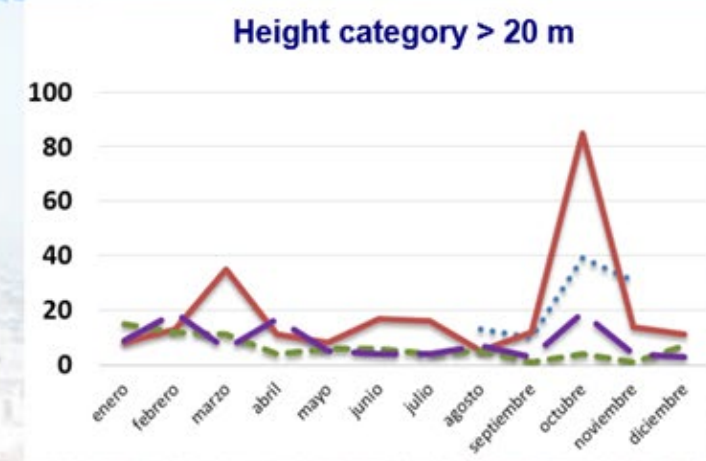
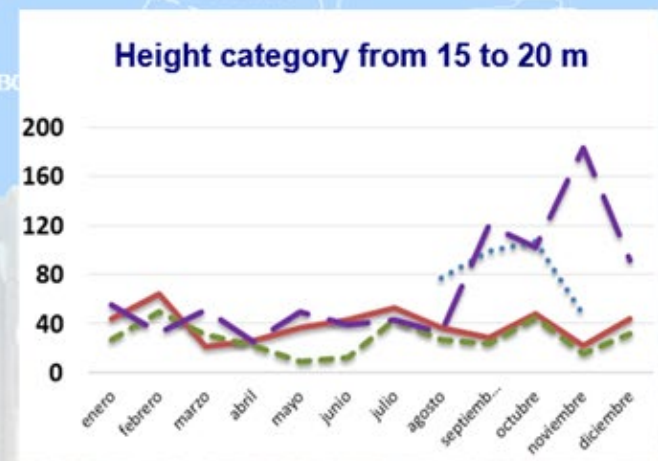
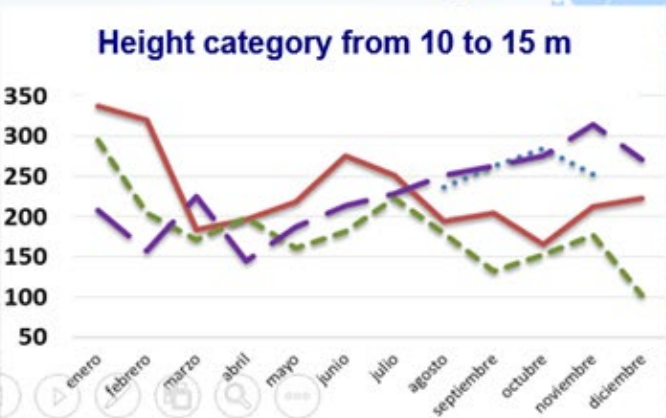
PRUNING CARRIED OUT ANALYSIS From April 22, 2013 to February 10, 2018

LIME - ASE 1

- Usaquén
- Suba



..... 2014 — 2015 - - - 2016 — 2017





Bogota's pruning plan, an essential planning and governance instrument

OBJECTIVE 1

Prioritize the technical criteria to define the appropriate treatment according to the need for pruning of each urban tree

Pruning Plan must contain at least

- Trees' census analysis in aspects related present species, zoning of the area by presence of species, number of individuals (universe per area), sizes, heights, physical and crown and trunk health status
- Historical data analysis performance of pruning by area
- **Activities prioritization (Trees with branches at risk of falling, trees with unbalanced crowns, tall trees, trees of a certain species susceptible to falling down, and so on.)**



Bogota's pruning plan, an essential planning and governance instrument

OBJECTIVE 1

Prioritize the technical criteria to define the appropriate treatment according to the need for pruning of each urban tree

Pruning Plan must contain at least

- Trees' census analysis in aspects related present species, zoning of the area by presence of species, number of individuals (universe per area), sizes, heights, physical and crown and trunk health status
- Historical data analysis performance of pruning by area
- Activities prioritization (Trees with branches at risk of falling, trees with unbalanced crowns, tall trees, trees of a certain species susceptible to falling down, and so on.)
- Determination of pruning intensity according to the number of the intervention, pruning type and tree size.
- Determination of a pruning cycle per individual/species/location.

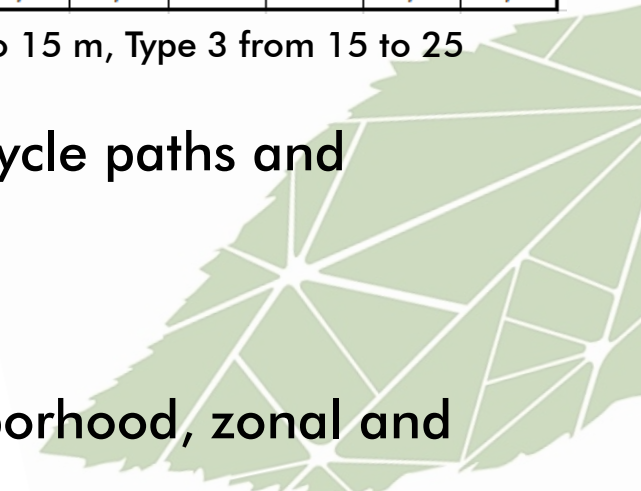


Bogota's pruning plan, Determination of a pruning cycle

Common name	Scientific name	Height	Amount	Growth speed	Observations	Pruning type	PRUNING CYCLE (MONTHS)											
							GROUP 1 SPOT				GROUP 2 SPOT				GROUP 3 SPOT			
							TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 1	TYPE 2	TYPE 3	TYPE 4
Abutilón pequeño	<i>Abutilón Insigne</i>	Up to 3 meters	32	Fast	Species suitable for urban trees	Height control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
						Raising	12	N/A	N/A	N/A	18	N/A	N/A	N/A	12	N/A	N/A	N/A
						Thinning	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
						Structure	12	N/A	N/A	N/A	18	N/A	N/A	N/A	12	N/A	N/A	N/A
						Sanitary	12	N/A	N/A	N/A	18	N/A	N/A	N/A	12	N/A	N/A	N/A
						Balance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alamo	<i>Populus deltoides</i>	Up to 10 meters	17	Media	Species suitable for urban trees	Height control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
						Raising	18	24	N/A	N/A	18	24	N/A	N/A	12	18	N/A	N/A
						Thinning	24	42	N/A	N/A	24	42	N/A	N/A	18	36	N/A	N/A
						Structure	18	24	N/A	N/A	18	24	N/A	N/A	12	18	N/A	N/A
						Sanitary	12	24	N/A	N/A	18	24	N/A	N/A	12	18	N/A	N/A
						Balance	24	42	N/A	N/A	24	42	N/A	N/A	18	36	N/A	N/A

Types 1, 2, 3 and 4 correspond to the height classes as follows: Type 1 from 0 to 5 m. , Type 2 from 5 to 15 m, Type 3 from 15 to 25 m., and Type 4 trees over 25 meters

- Group 1: Trees located on platforms, vehicular and railway corridors, cycle paths and pedestrian paths.
- Group 2: Trees located in environmental strips and water circuits.
- Group 3: Trees located in squares, small squares, pocket parks, neighborhood, zonal and metropolitan parks.



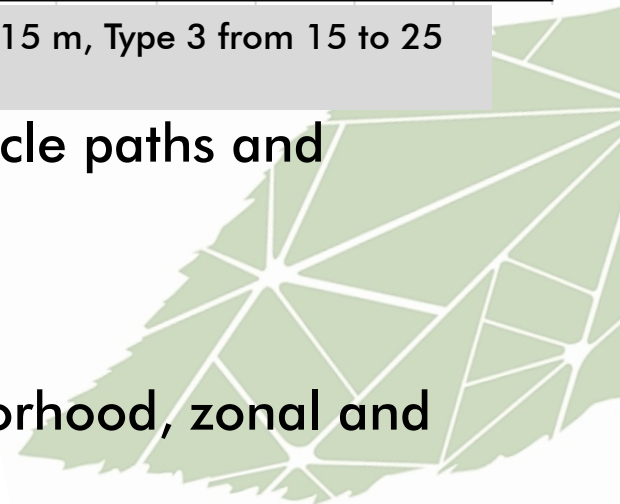


Bogota's pruning plan, Determination of a pruning cycle

Common name	Scientific name	Height	Amount	Growth speed	Observations	Pruning type	PRUNING CYCLE (MONTHS)											
							GROUP 1 SPOT				GROUP 2 SPOT				GROUP 3 SPOT			
							TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 1	TYPE 2	TYPE 3	TYPE 4
Abutilón pequeño	<i>Abutilón Insigne</i>	Up to 3 meters	32	Fast	Species suitable for urban trees	Height control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
						Raising	12	N/A	N/A	N/A	18	N/A	N/A	N/A	12	N/A	N/A	N/A
						Thinning	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
						Structure	12	N/A	N/A	N/A	18	N/A	N/A	N/A	12	N/A	N/A	N/A
						Sanitary	12	N/A	N/A	N/A	18	N/A	N/A	N/A	12	N/A	N/A	N/A
						Balance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alamo	<i>Populus deltoides</i>	Up to 10 meters	17	Media	Species suitable for urban trees	Height control	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
						Raising	18	24	N/A	N/A	18	24	N/A	N/A	12	18	N/A	N/A
						Thinning	24	42	N/A	N/A	24	42	N/A	N/A	18	36	N/A	N/A
						Structure	18	24	N/A	N/A	18	24	N/A	N/A	12	18	N/A	N/A
						Sanitary	12	24	N/A	N/A	18	24	N/A	N/A	12	18	N/A	N/A
						Balance	24	42	N/A	N/A	24	42	N/A	N/A	18	36	N/A	N/A

Types 1, 2, 3 and 4 correspond to the height classes as follows: Type 1 from 0 to 5 m. , Type 2 from 5 to 15 m, Type 3 from 15 to 25 m., and Type 4 trees over 25 meters

- Group 1: Trees located on platforms, vehicular and railway corridors, cycle paths and pedestrian paths.
- Group 2: Trees located in environmental strips and water circuits.
- Group 3: Trees located in squares, small squares, pocket parks, neighborhood, zonal and metropolitan parks.





Bogota's pruning plan, an essential planning and governance instrument

OBJECTIVE 1

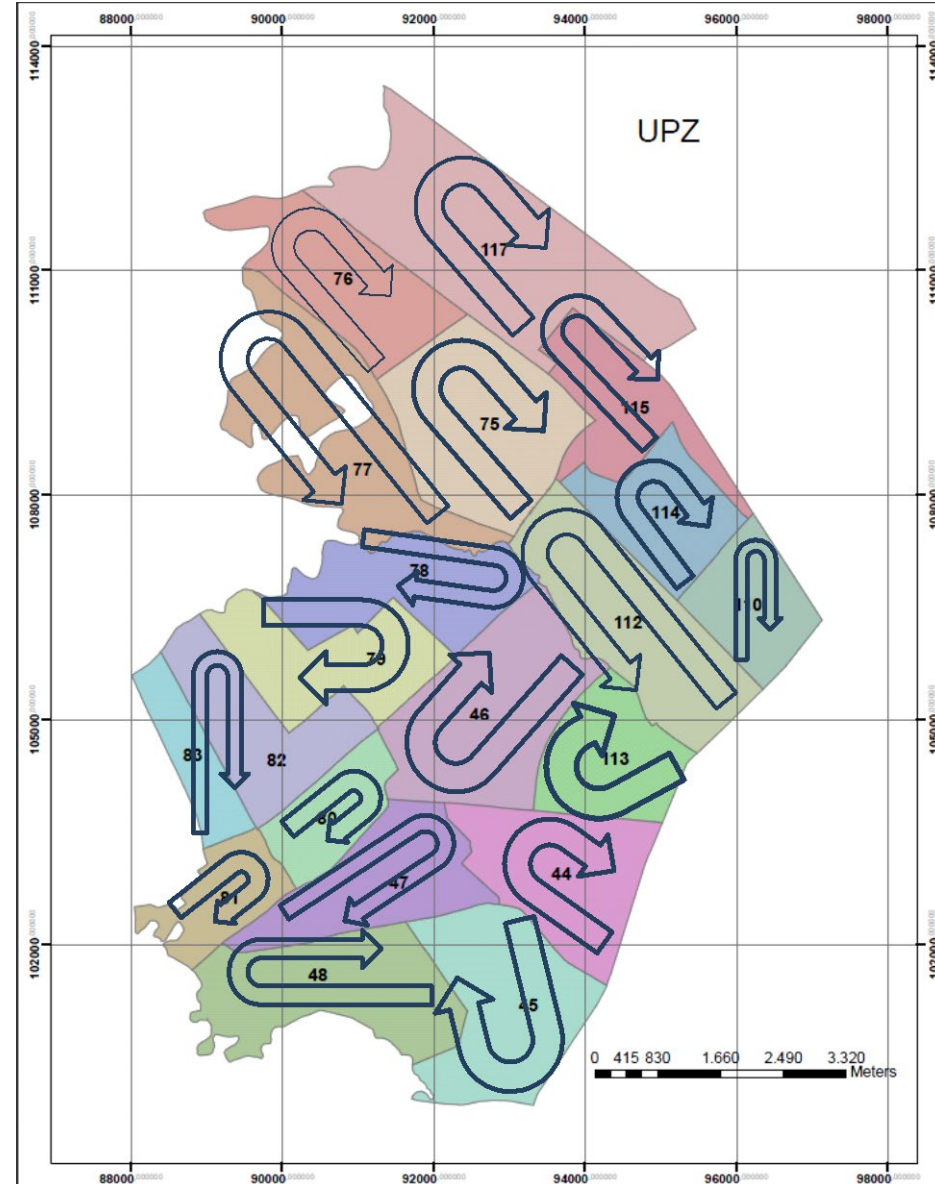
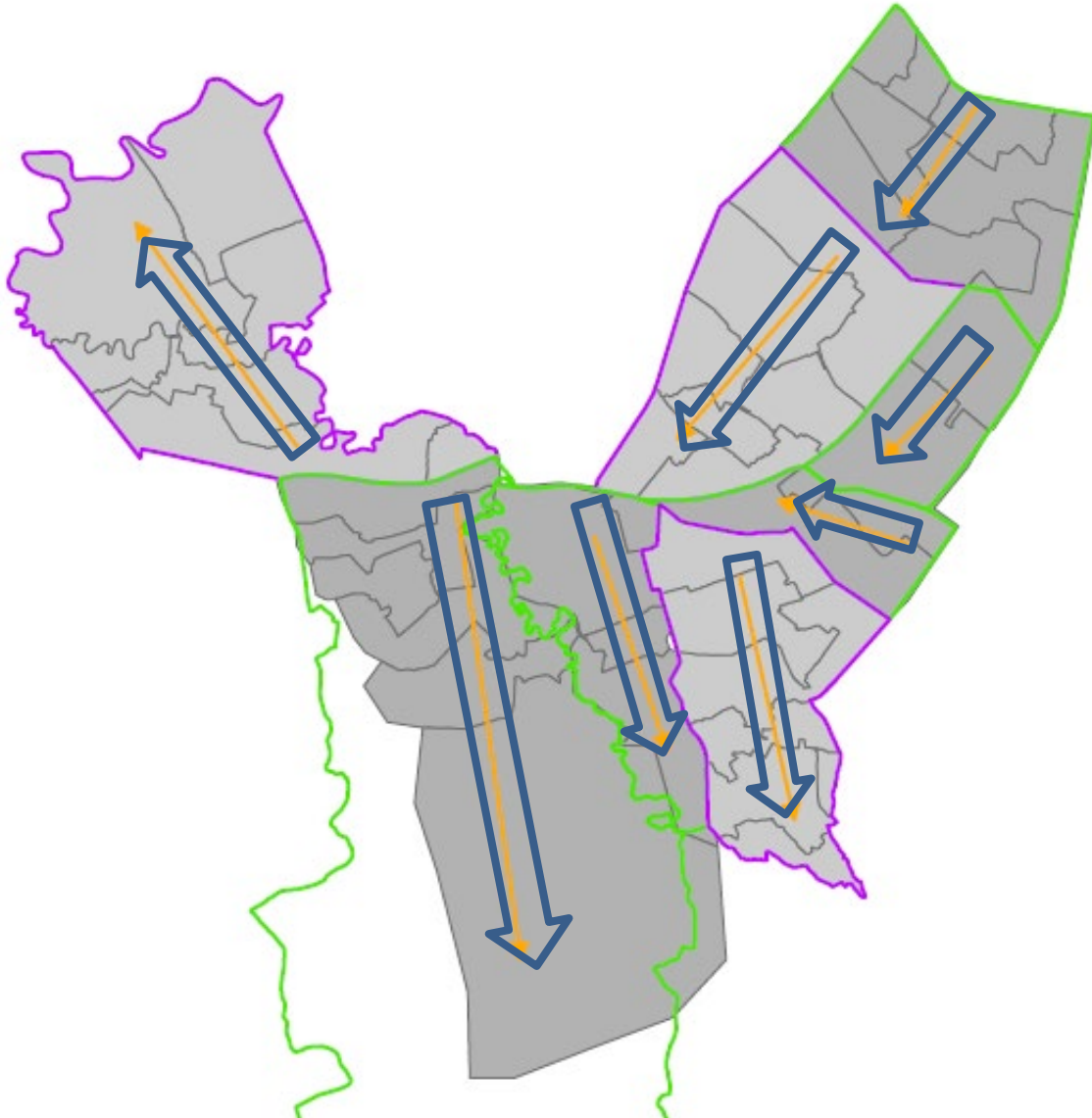
Prioritize the technical criteria to define the appropriate treatment according to the need for pruning of each urban tree

Pruning Plan must contain at least

- Trees' census analysis in aspects related present species, zoning of the area by presence of species, number of individuals (universe per area), sizes, heights, physical and crown and trunk health status
- Historical data analysis performance of pruning by area
- Activities prioritization (Trees with branches at risk of falling, trees with unbalanced crowns, tall trees, trees of a certain species susceptible to falling down, and so on.)
- Determination of pruning intensity according to the number of the intervention, pruning type and tree size.
- Determination of a pruning cycle per individual/species/location.
- **Scheduling activities to fulfill the Pruning Plan**



Bogota's pruning plan, Scheduling Activities and Routes definition





Cualquier inquietud frente al servicio de aseo
Comunicarse a la línea: 110
Avenida Boyacá No. 6B - 20

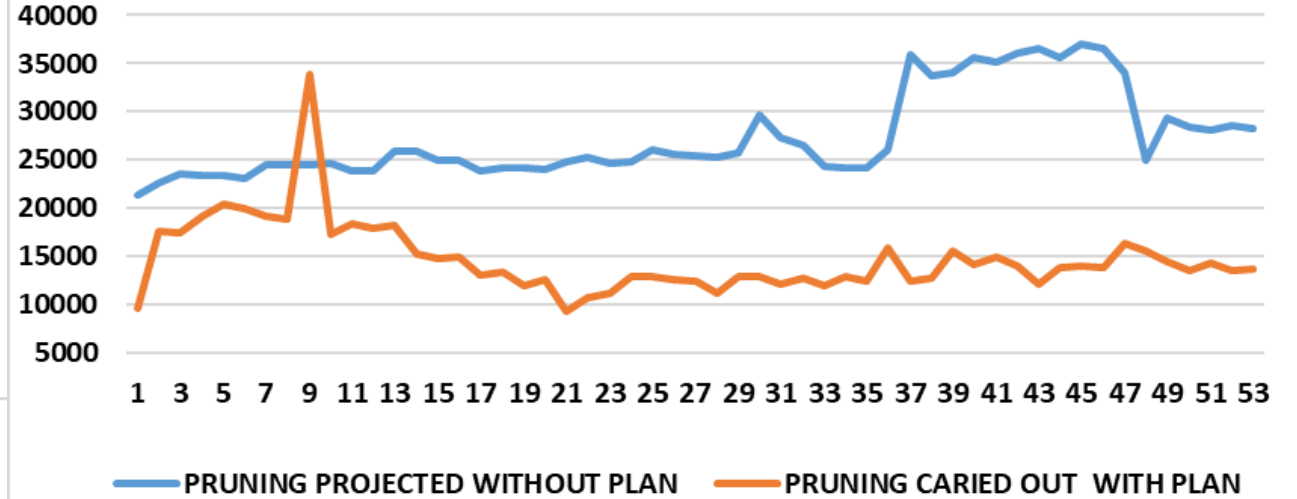




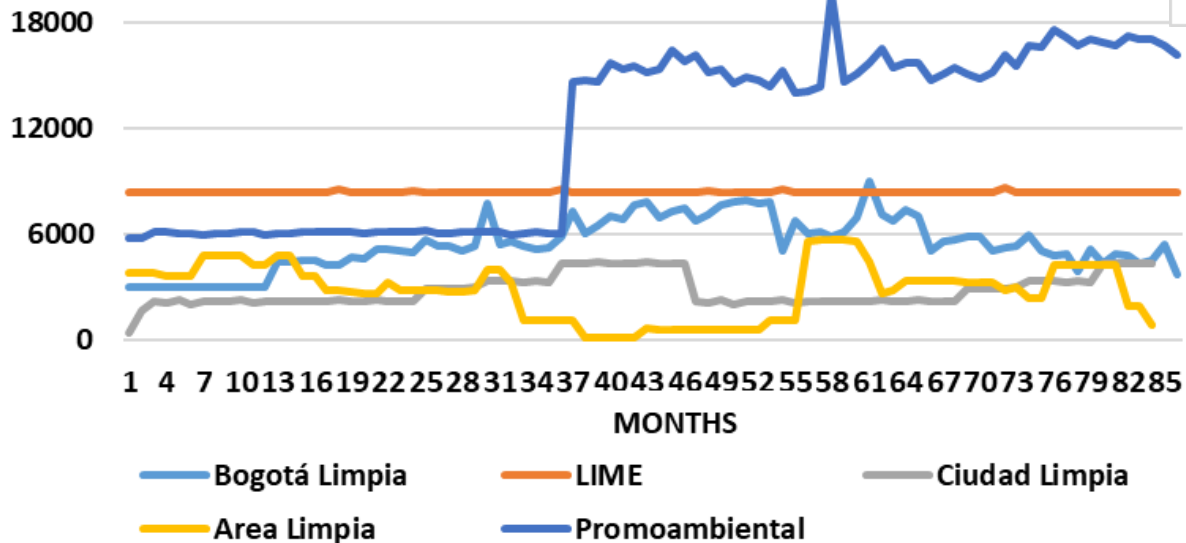
REQUIRED STAFF:

- 10 Forest Engineers for Coordination of activities
- 14 crews
- 14 Forest Engineers Crew Leaders
- 70 Pruners
- 30 Auxiliaries
- 14 Drivers
- 8 Forest Engineers monitoring

PRUNING SCHEDULING WITHOUT PLAN Vs PRUNING CARRIED OUT WITH PLAN 2019 - Jun 2023



Monthly pruning projection by operator



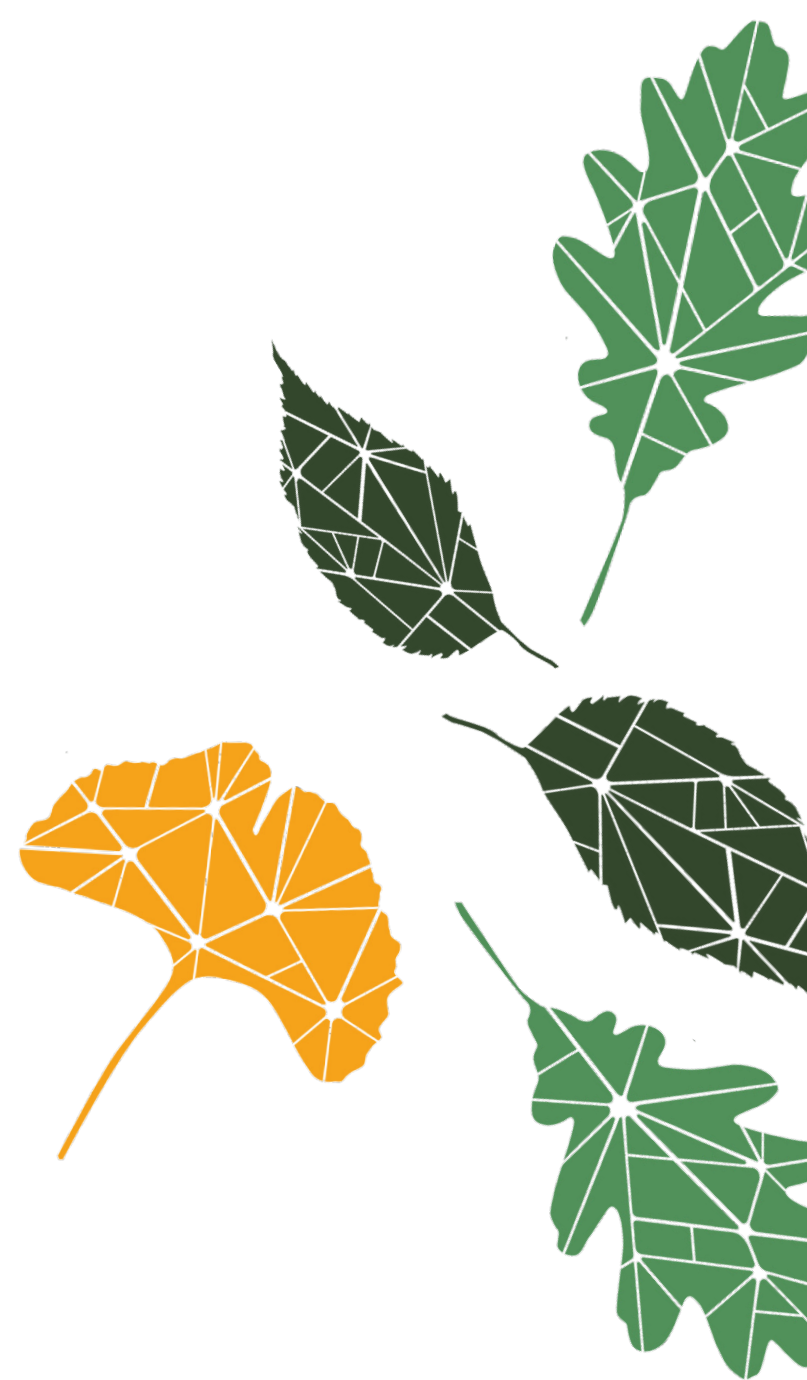


2nd World Forum on Urban Forests

Washington DC, 2023

Bogotá's pruning plan, an essential
planning and governance instrument

Partial outcomes' Bogotá's pruning plan





OBJECTIVE 2

Efficiency and economy of processes

- Reduction of requests for pruning procedures from more than 200 to less than 10 per month.

OBJECTIVE 3

Stopping the duplication of treatments carried out and continuous improvement in inter-institutional coordination

- Effect obtained through the precise identification of the treated tree through its SIGAU code and the monitoring carried out by the Environmental Authority.

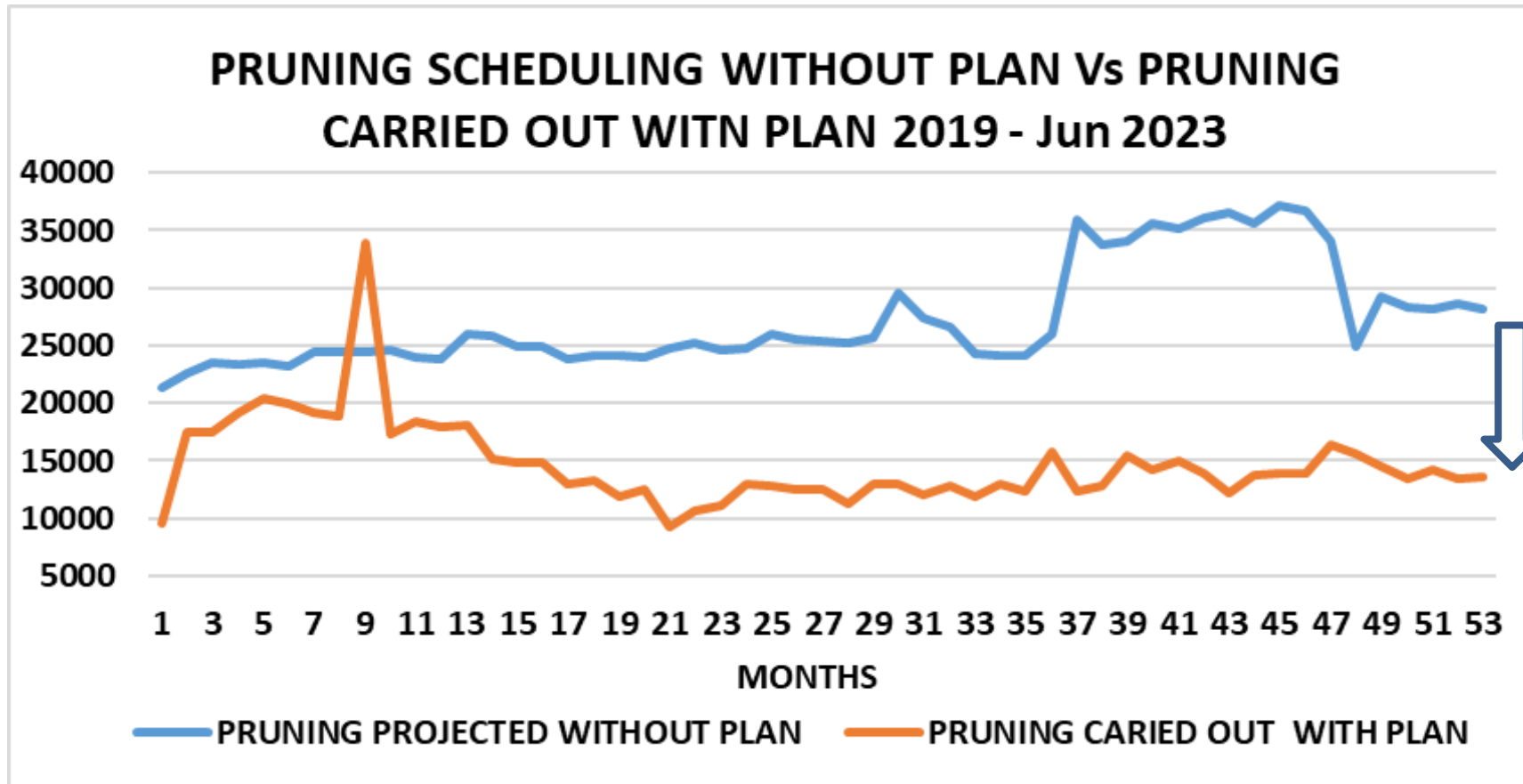
OBJECTIVE 4

The technical need to carry out tree pruning has been prioritized over any other interest (Commercial, Political or Community)

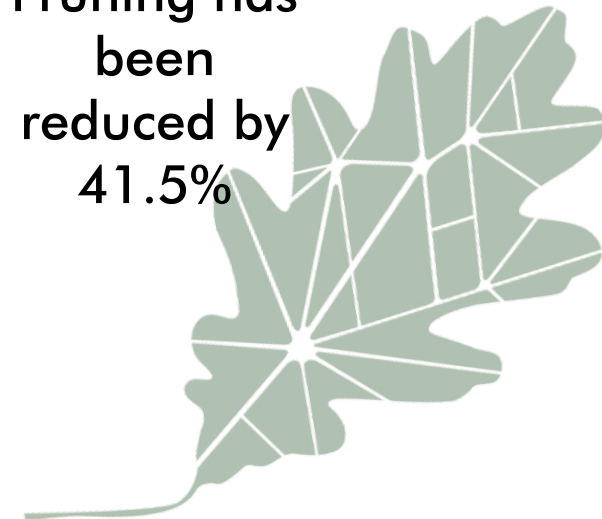
- All pruning have technical support documented both in a database and in technical sheets, which is allowing the generation of the information required to analyze in detail the different aspects of the Pruning Plan for future adjustments.



- In the reported period, 655.949 interventions were carried out
- 527.744 trees have been pruned, representing 44,38% of the urban tree census
- 19,54% of the urban tree census, which corresponds to 128.205 trees, has already received the second pruning.



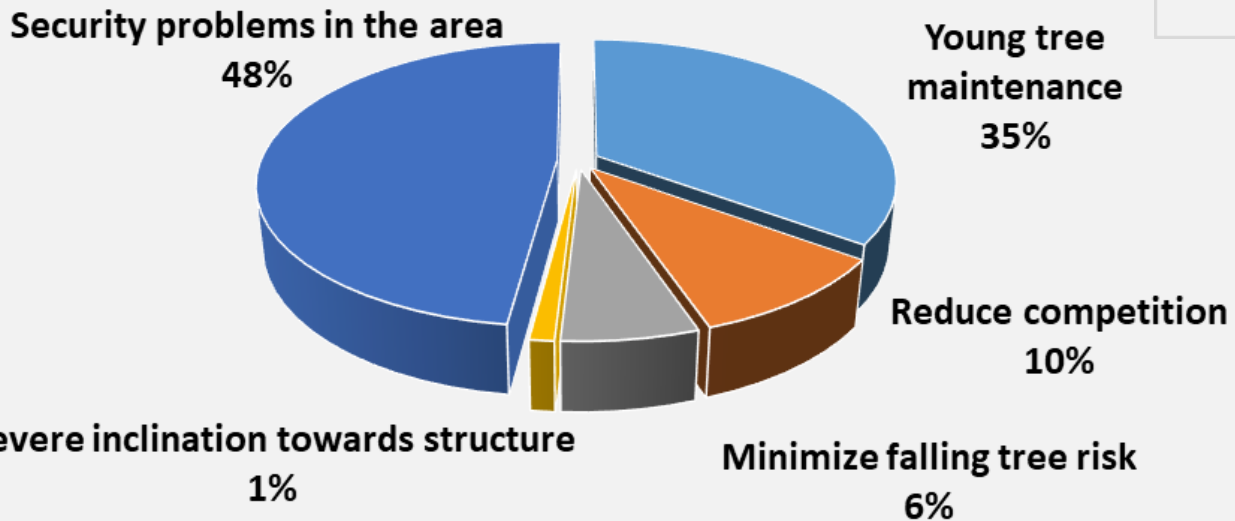
- Pruning plan has a progress of 66.19%
- Pruning has been reduced by 41.5%



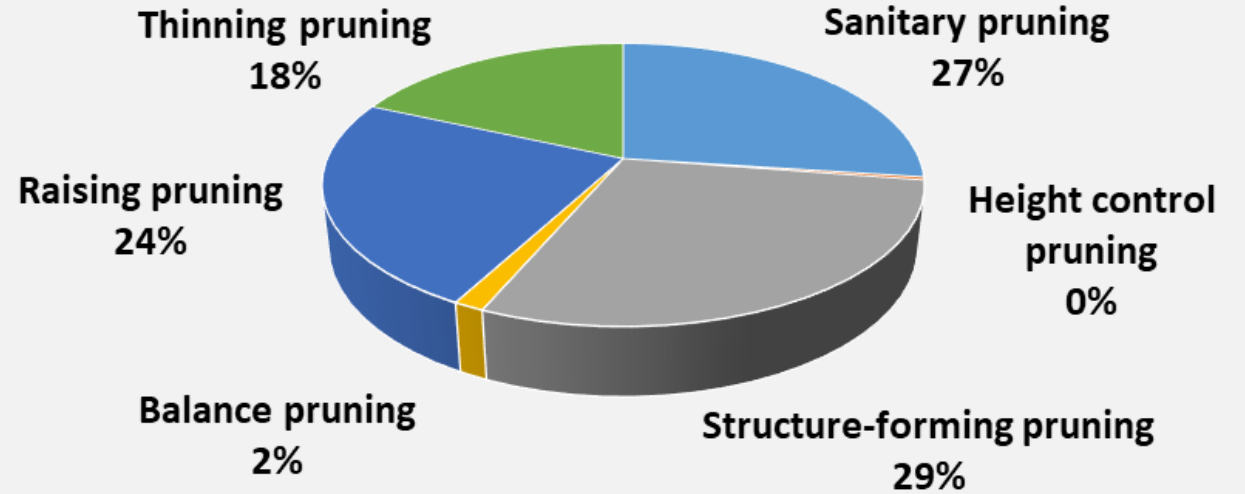


CONTROL OF TECHNICAL CONCEPTUALIZATION, SUPPORT FOR APPLIED PRUNING

Technical assessment that supports the pruning carried out in the period 2019 - Jun 2023

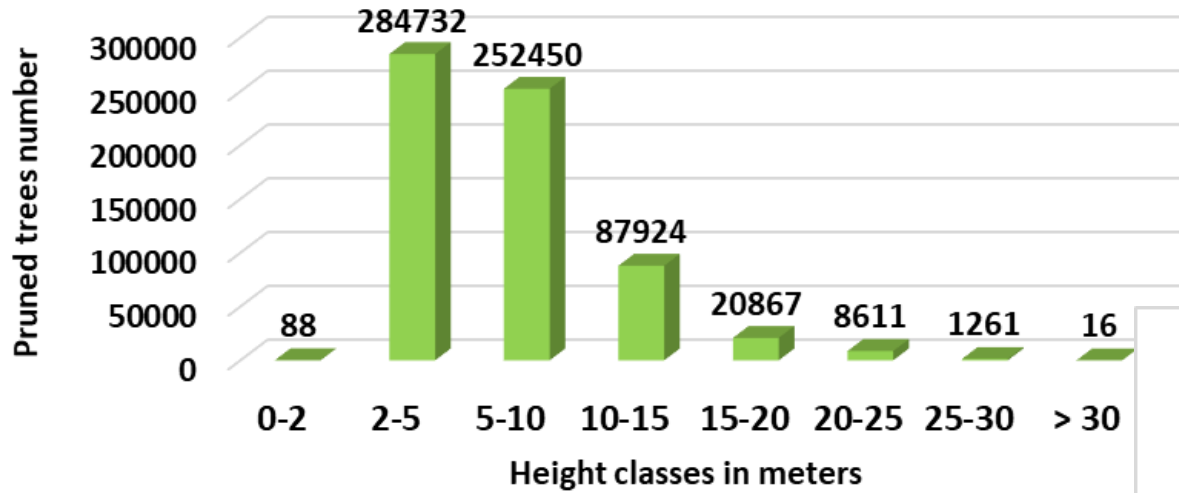


Pruning type carried out in the period 2019 - Jun 2023



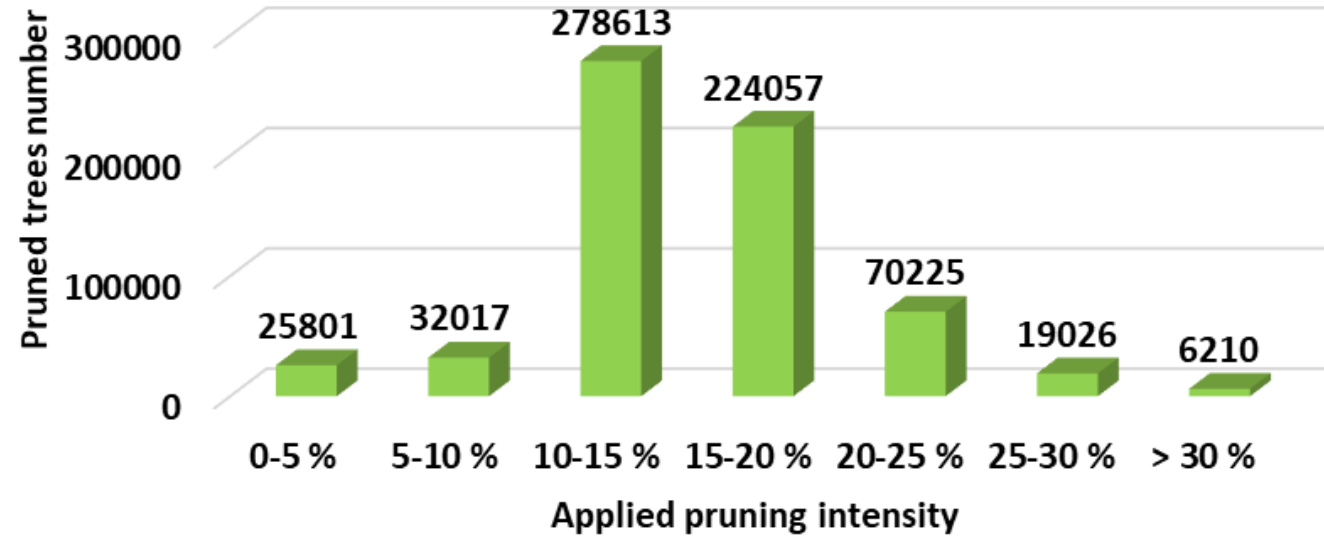


**Pruned trees number by height classes, period 2019 -
Jun 2023**



APPLIED PRUNING INTENSITY CONTROL

**Number of trees by classification of applied pruning
intensity, period 2019 - June 2023**





COMUNICADO 14 - 2020 Poda de Árboles





Thank you

German Tovar Corzo

SERAMBIENTE

Forest Engineer

 **gtcorzo@ yahoo.com**



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation





CEUs

Session 1.1: Elysium: Creating the policy and legal framework to support the role of urban forests as public health infrastructure



PP-23-3555



**World Forum on
Urban Forests**